EVALUATION OF THE IMPACT OF AN ADULT ASTHMA EDUCATION PROGRAM ON QUALITY OF LIFE

by

JENNIFER GABRIELLA OLAJOS-CLOW

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ABSTRACT

The purpose of this study was to determine what impact a behaviour modification based adult asthma education program would have on generic and asthma-specific quality of life (QOL) and to determine if any correlation existed between QOL and patient's perception of asthma control. Outcome measures were collected via an interviewer-administered asthma management questionnaire, self-administered generic (SF-36) and asthma-specific (AQLQ) QOL questionnaires and a perceived control of asthma questionnaire (PCAQ) at baseline, one month and three months post education.

The cohort (n=37) consisted of female (73%), married (59.5%), middle income (30.3%) subjects with severe asthma (67.6%) that had completed a university or college education (25%) and were working full-time (45.9%). The mean age was 49.32 (SD=16.37) years. In comparison to Canadian normative data, this cohort scored lower in all eight domains of the generic QOL scale.

Changes in the generic QOL scale were found in the physical functioning, role physical, bodily pain, vitality, and role emotional domains. Changes were also found in all four asthma-specific QOL domains (activity limitations, emotional function, exposure to environmental stimuli and symptoms) as well as overall asthma QOL score.

Perceived control of asthma increased and was related to asthma symptoms and total asthma-specific QOL at one month and symptoms, environmental stimuli, emotional function, and total asthma-specific QOL at three months. Perceived control of asthma was related to the role physical domain of the generic QOL scale at baseline; physical functioning, vitality, and general health domains at one month and general health, role physical, and mental health domains at three months.

It was concluded that both generic and asthma-specific QOL improved after attending a behaviour modification based adult asthma education program. Significant associations were found to exist between perceived control of asthma and both generic and asthma-specific QOL.

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CHAPTER 1: INTRODUCTION

The Problem

Asthma is a chronic inflammatory disorder that affects approximately 5–10% of the population of Canada (Boulet, Chapman, Green, & Fitzgerald, 1994). Over the past 20 years there has been a dramatic increase in the understanding of the pathophysiology and treatment of asthma. Despite this increase in knowledge and understanding of asthma, the morbidity and mortality rates continued to rise in the 1970s and 1980s (Bates & Baker-Anderson, 1987). A recent report in Canada suggests that although rates remain high, they appear to be stabilizing (National Asthma Control Task Force, 2000). Although the causes of these trends are multifactorial, morbidity and mortality have been linked in part to undertreatment of asthma by physicians and to the lack of response to symptoms by the person with asthma (Boulet & Chapman, 1994; Jin et al., 2000). Approximately five hundred deaths occur per year in Canada and it is estimated that 80% of these are preventable (Institute for Clinical Evaluative Services in Ontario, 1996).

In efforts to decrease asthma morbidity and mortality, Canadian and International asthma consensus guidelines have been developed and updated (Boulet, Becker, Berube, Beveridge, Ernst, 1999; Ernst, Fitzgerald, & Spier, 1996; NIH, 1992, 1997). The guidelines include asthma education as an integral part of the treatment and management of asthma. Numerous asthma education programs have been developed and have been shown to improve asthma outcomes such as asthma symptoms, frequency of attacks, absenteeism, health care utilization and ability to perform activities of daily living (Kostes et al., 1995; Yoon, McKenzie, Bauman, & Miles, 1993; Côté et al., 1997).

However, the majority of research has focused on physiological measures of the disease with a limited amount of research on quality of life (QOL) of individuals with asthma.

QOL can be defined as an individual's overall satisfaction or happiness with life within the areas or domains he or she deems important (Oleson, 1990). Health related QOL (referred to as QOL in this thesis) is a concept that accentuates the effects of a disease on overall well-being in multiple domains such as physical, emotional, social and cognitive functioning (Juniper, 1991). Health related QOL is therefore not merely the absence of disease but a concept that encompasses much more. There is increasing evidence that correlations between clinical measures of asthma severity and health-related QOL are poor (Juniper, 1997). Thus, more research is needed to determine the relationship between asthma severity and QOL and the impact of asthma education on QOL.

Purpose

The purpose of this study was to evaluate the impact of a standardized behaviour modification based adult asthma education program on persons with asthma. The study addressed three questions:

1. Would there be a difference in generic and asthma-specific QOL in patients with asthma after participating in a behaviour based asthma education program?
2. Would the patient's perceived control of asthma increase after participating in a behaviour based asthma education program?
3. Would there be a relation between generic QOL and perception of control as well as asthma-specific QOL and perception of control in adult asthma patients who attended a behaviour based asthma education program?

Research Hypotheses

1. Generic and disease-specific QOL would improve for adult patients participating in a behaviour based asthma education program.
2. Perceived control of asthma would improve for adult patients participating in a behaviour based asthma education program.
3. There would be a positive relation between perception of control for adult patients participating in a behaviour based asthma education program and generic and disease-specific QOL.

CHAPTER 2: LITERATURE REVIEW

Asthma Education

Early efforts in asthma education began in the 1970s in response to the increasing morbidity and mortality rates throughout the world (Wilson & Starr-Schneidkraut, 1994). Educational efforts that were initially directed towards children eventually evolved to include the adult population (Wilson & Starr-Schneidkraut, 1994). Evaluation studies quickly surfaced thereafter in attempts to determine the effectiveness of these educational efforts. However, multiple confounding variables such as the variable natural history of asthma, concomitant prescription of new medications, access to health care, and health care provider decisions and policies have made it difficult to quantify their impact (Evans, 1996). In addition, programs vary in setting, sample characteristics, method of delivering education and outcome measures and, therefore, are difficult to compare. Despite all of these factors, randomized controlled studies have demonstrated significant changes in certain asthma outcome measures (Kostes et al., 1995; Yoon et al., 1993; Côté et al., 1997).

The American Institutes for Research and the Northern California Kaiser-Permanente Medical Group have developed a behaviour modification based adult asthma education program (AIR, Kaiser-Permanente Medical Group, National Heart Lung and Blood Institute, National Asthma Education and Prevention Program, 1993). In a randomized controlled trial examining the effectiveness of the education program, significant improvements were reported in asthma knowledge, frequency of symptoms, medication compliance, and other self-management behaviours as well as a long-term decrease in acute medical visits for asthma exacerbations (Wilson et al., 1993). In this

study, group education was as effective as individual education, suggesting potentially greater cost-effectiveness. However, this was a highly selected population of well-educated working adult members of an American health maintenance organization, and the participation rate was only 56%. In addition, QOL was not formally evaluated. Whether these results can be generalized to the Canadian health care system with differing sub groups has not been determined.

The efficacy of asthma education programs depends largely upon the educational framework and disease severity of the target population (Boulet et al., 1994). Therefore, it is difficult to determine whether one education program or delivery method is superior. However, it appears that the educational process is best initiated and controlled by the primary care physician or consultant, but actually delivered by another health care professional (e.g. nurse) who has received specialized training in asthma education (Boulet et al., 1994). The literature emphasizes a team approach to self-management, which should be reflected in the asthma education program (Ernst et al., 1996; NIH, 1992, 1997). The greatest and most sustained improvements in clinical morbidity measures and health care utilization have been documented by programs which incorporate behaviour modification theories and aim to improve self-management behaviour rather than knowledge alone (Wilson et al., 1993; Bailey, 1996).

Quality of Life

The majority of asthma outcomes research has focused on morbidity measures (symptoms, exacerbations, absenteeism, health care utilization and activities of daily living), asthma knowledge, self-management skills, and cost (Ignacio-Garcia & Gonzalez-Santos, 1995; Mayo, Richmond & Harris, 1990; Krahn, Berka, Langlois, &

Detsky, 1996). The assumption is that if physiological improvement is seen, then an improvement in QOL should occur as well. Research regarding the impact that asthma has on QOL is relatively recent. The majority of research has been done in the last 10 years, most of which has been on instrument development. Some researchers have demonstrated that asthma education programs improve asthma outcomes including QOL (Boulet, Boutin, Côté, Leblanc, & Laviolette, 1995; Turner, Taylor, Bennett & Fitzgerald, 1998). However others have shown no effect on QOL (Abdulwadud, Abramson, Forbes, James & Walters, 1999).

QOL may be measured using generic or disease-specific instruments. A generic QOL instrument allows comparison of research across different diseases while disease-specific QOL instruments are more likely to be responsive to changes in the characteristics that are of interest to the disease being evaluated (Richards & Hemstreet, 1994). Therefore both generic and disease specific questionnaires should be considered when researching QOL (Richards & Hemstreet, 1994).

In a recent review article, Schmier, Chan, and Kline-Leidy (1998) supported the premise that asthma has the potential to adversely affect the physical, psychological and social domains of health-related QOL. Some variables have been found to have a direct impact on health-related QOL: treatment regimes and pharmacological interventions. The extent to which behavioural interventions affect health-related QOL is less clear.

One randomized control trial addressed the effect of a behaviour-based educational intervention on QOL. This study (Lahdensuo et al., 1996) compared guided self-management and traditional treatment. Specially trained nurses delivered the education and provided peak flow guided action plans. The peak flow, or peak expiratory

flow rate (PEFR), is the maximum flow rate of air exhaled during forced expiration and is measured by a hand held device called a peak flow meter. St. George's Respiratory Questionnaire (Jones, Quirk, Baveystock & Littlejohns, 1992) was utilized to measure generic QOL. This study demonstrated a significant improvement in QOL and significant decreases in unscheduled doctor visits, days off work, courses of antibiotics and corticosteroids.

Turner et al. (1998) compared the effectiveness of action plans using either peak flow monitoring versus symptom monitoring along with an asthma education program. The patients were randomized to either group; however, a control group was not used. Both groups showed significant improvements in lung function, symptom scores as well as QOL. QOL was measured using Juniper's Asthma Quality of Life Questionnaire (AQLQ) and no differences were found between groups (Turner et al.).

In a case-controlled retrospective study, Boulet et al. (1995) also found a significant improvement in asthma-specific QOL. The most profound changes were seen in the symptom domain and were sustained one year after participating in the education program. Other outcome measures such as knowledge, emergency room visits and days off work improved significantly post-education.

Perception of Control

Perception of control is a variable thought to have an effect on health-related QOL. It is important to understand a person's perceived ability to assess and appropriately react to an asthma exacerbation. Exactly how much this perceived ability affects QOL is unknown. There is a paucity of literature evaluating this relation. In response to the lack of research, Katz, Yelin, Smith and Blanc (1997) recently developed

and validated the Perceived Control of Asthma Questionnaire (PCAQ) for use in future studies.

Self-Efficacy

Bandura outlines the role of self-efficacy as part of his Social Cognitive Theory (Bandura, 1986). According to Bandura (1986; 1997), self-efficacy is an individual's perceived ability to cope with a given situation and is behaviour-specific. Knowledge provides the foundation for change; however, additional self-influences are required to assist in overcoming the barriers to making a behaviour change. A sense of efficacy is considered to influence many processes of human functioning. Therefore, perceived self-efficacy about outcome is crucial for making lifestyle changes (Bandura, 1997).

If individuals believe that they are able to perform certain behaviours adequately, they are said to have higher self-efficacy and this should be a good predictor of future motivation and behaviour. Those who have a low self-efficacy may be able to perform a certain skill well, however believe that their performance is unsatisfactory. These individuals tend to avoid challenging situations, as they believe that it exceeds their personal skill level. They shy away from difficult tasks and perceive tasks as being more difficult than they actually are. This can result in decreased involvement and these individuals may experience a higher level of anxiety or stress, which can undermine their performance (Bandura, 1986).

High self-efficacy, on the other hand, is evident in individuals who believe that they will perform a skill adequately and are motivated to do so. These individuals show an increased effort and persistence and are focused on the task at hand. Instead of shying away from a challenge, it is used by the individual as motivation to succeed. They do not

attribute failures to a perceived inability to perform the task but to insufficient effort. These individuals are more involved, set challenges for themselves and are more motivated (Bandura, 1986).

Bandura suggests four efficacy-enhancing techniques: enactive attainment, vicarious experience, physiological state and verbal persuasion. Enactive attainment or skills mastery proposes to enhance self-efficacy by taking a desired skill or outcome and breaking it down into small achievable and more manageable skills. In asthma, self-management is an essential skill required to recognize when asthma is not under control and how to react. In order to learn this skill, self-management needs to be broken down into small more manageable skills. Once each skill is mastered and is incorporated into overall self-management, it may lead to improved self-efficacy (Mesters, Meertens, Kok, & Parcel, 1994; Shigog et al., 2001).

Vicarious experience or modeling can occur through the use of role model(s) to enhance self-efficacy. Someone who can successfully deal with his or her asthma on a day-to-day basis can serve as an adequate role model. The most common method for providing vicarious experience is through group classes. Interaction between individuals with similar asthma severity levels may assist in enhancing self-efficacy. Individuals who have a low self-efficacy will be able to see others who can cope and manage their asthma effectively. Maiman, Green, Gibson and MacKenzie (1979) demonstrated the value of vicarious role modeling. Asthma patients were randomized upon discharge from the emergency department to receive asthma education from either a nurse who had asthma herself or from one of the other nurses. The patients who were assigned to the nurse with asthma were further randomized into two groups and were either informed the

nurse had asthma or remained unaware that she had asthma. The patients who were aware that their nurse educator had asthma had the fewest subsequent emergency visits.

Reinterpretation of physiological signs is the third method of enhancing self-efficacy. Individuals rely on feedback from their physiological state as a method of judging their competency levels (Bandura, 1986). Individuals with asthma can carry out daily activities while experiencing symptoms. They can accept that this is normal and the product of having a chronic disease that leaves them vulnerable. Education about asthma and what is considered acceptable asthma control may enhance self-efficacy.

According to Bandura (1986), verbal persuasion is the least effective means to enhance self-efficacy. Simply telling someone they have the capability to perform a skill or have the ability to change an outcome does not lead to enhanced self-efficacy. He does state, however that used in conjunction with other techniques, it can contribute to increased self-efficacy. The difficulties arise when unrealistic goals or expectations are not met and the "persuader" is then discredited. This subsequently may lead to decreased self-efficacy.

Summary

This literature review focused briefly on how asthma education has evolved from efforts to promote compliance with medical regimes to assisting people to gain control of their asthma through self-management. It was then noted that research into the effect that asthma had on an individual's QOL is relatively new. It is proposed that QOL may be as important an outcome measure as are symptoms, knowledge, health care utilization, cost and other morbidity measures following asthma education interventions. Furthermore, if education is designed to help individuals improve their self-management skills, they

should in turn possess greater perceived control. Self-efficacy, or perceiving one's competence to perform specific actions to maintain desired outcomes is a key component of the Social Cognitive Theory. Bandura proposes that increased self-efficacy can lead to an improvement in specific health behaviours, motivation and overall well-being. These principles are the basis for many education programs used in self-management of chronic illness and specifically for the asthma education intervention used in this study.

CHAPTER 3: METHODS

Participants

Potential subjects were recruited from referrals received at the Kingston General Hospital (KGH) Asthma Education Centre (AEC). Thirty-seven subjects were recruited from referrals of 241 patients to the AEC at KGH for testing on three occasions from January 1999 until January 2001. All patients ≥16 years of age referred to the education centre were invited to participate and written, informed consent was obtained prior to participation.

For this study, asthma was operationally defined as a disorder of the airways that is characterized by paroxysmal or recurrent symptoms (cough, wheeze, chest tightness, and dyspnea), with variable airflow limitation and airway hyperresponsiveness to a variety of stimuli (Ernst et al., 1996). Thus, the inclusion criteria were as follows. Participants were expected to have objective evidence of asthma as defined by the 1996 Canadian Consensus Guidelines (Ernst et al., 1996) including at least one of the following:

1. Peak Expiratory Flow Rate (PEFR)
    (a) mean percentage difference between the highest and lowest PEFR values (AM and PM on the same day) of 20% or more over a period of several weeks;
    (b) 20% or greater improvement in PEFR 15 min after 200 to 400 μg inhaled salbutamol or equivalent;

2. Spirometry

    (a) spontaneous variability (at least 20%) in forced expiratory volume in one second (FEV1);

    (b) 12% or greater improvement from baseline FEV1 15 min. after short-acting inhaled beta$_2$-agonist (in adults, at least 180 ml);

    (c) any changes in FEV1 that occur over time (either without any specific therapeutic intervention or after a prolonged course of oral or inhaled corticosteroids) should demonstrate an increase greater than 20 % (at least 250 ml);

3. Airway hyperresponsiveness

    (a) in subjects with normal FEV1, excessive bronchoconstrictor responsiveness can be documented by finding hyperresponsiveness to histamine or methacholine.

However, when objective evidence was not available, subjective evidence of asthma such as patterns of symptoms (wheeze, cough particularly at night, difficulty breathing, chest tightness) that were responsive to traditional asthma therapy and symptoms that occurred or worsened in the presence of exercise, viral infection, animals, mould, dust or dust mites, smoke (tobacco or wood), pollen, changes in weather, strong emotional expression (laughing or crying hard), airborne chemicals or dusts, menses at night or early in the morning was used (NIH, 1997). Exclusion criteria included subjects less than 16 years of age and those with cough equivalent asthma, bronchiectasis, emphysema, chronic bronchitis, cystic fibrosis and chronic obstructive pulmonary disease.

Ethical approval for the study was obtained from the Queen's University Research Ethics Board. The information and consent form can be found in Appendix A. The study did not alter the usual care received by patients in the AEC.

Instruments

Asthma Management Questionnaire (AMQ)

The AMQ is a 50-item (initial; Appendix B) and 41-item (follow-up; Appendix C) interviewer-administered questionnaire that obtains information on patient demographics, PEFR, current asthma symptoms, current asthma medications, comorbidities and health care utilization that takes approximately 20 min to complete. It was developed by Case Mix Research, Department of Community Health and Epidemiology, Queen's University at Kingston (Lougheed et al., 1997). The AMQ has face validity and content validity. Content validity was determined using an expert panel who revised an original set of 70 questions derived from the literature to 50 questions based on the responses of 1500 subjects. A prospective study in the KGH Asthma Clinic and six other Canadian centres found the AMQ responsive to change (Hopman, Owen & Gagne, 1999). Repeatability has not been reported.

Asthma Quality of Life Questionnaire (AQLQ)

The Asthma Quality of Life Questionnaire (AQLQ) (Juniper et al., 1991, 1993, 1994) is a 32-item self-administered questionnaire with a 7-point scale for response where 1 represents the greatest impairment possible and 7 represents the least impairment possible that takes approximately 5 to 10 min to complete. The AQLQ is disease-specific and has demonstrated internal consistency (intraclass correlation coefficient = .92), validity (significant longitudinal and cross-sectional correlations between asthma QOL

and measures of both clinical asthma and generic QOL, $p < .001$) (Juniper et al., 1991) and responsiveness to change (Rowe & Oxman, 1993). It is designed to measure asthma specific QOL in four domains: activity limitation (11 items), symptoms (12 items), emotional function (5 items) and environmental exposure (4 items). In addition, it provides an overall QOL score. The minimum clinically important difference for the overall score and each of the four domains has been identified as 0.5. A difference of 1.0 represents a moderate change, whereas scores having differences greater than 1.5 are considered a large change (Juniper et al., 1994). Permission for use of the questionnaire in this study was obtained (Personal communication with Dr. E. Juniper).

Rand 36-Item Health Survey (SF-36)

The Rand 36-Item Health Survey (SF-36) is a 36-item self-administered generic QOL instrument developed by Ware and Sherbourne (1992) and takes approximately 5 to 10 min to complete. Bousquet et al. (1994) have reported on the instrument's internal consistency (Cronbach a = 0.91) and validity (significantly related to clinical asthma measures and asthma severity, $p < .001$) for use in asthma. This questionnaire covers 8 health domains: physical functioning (PF), role physical (RP), bodily pain (BP), general health perceptions (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH). Physical functioning measures the level of limitation an individual may have in physical activities such as walking and climbing stairs whereas role physical measures difficulties with work or other daily activities as a result of their physical health. Bodily pain measures limitations that an individual may experience due to pain. General health perception measures perception of overall health and the individual's expectation of any change in their health status. Vitality measures energy level and

tiredness. Social functioning measures how physical and emotional problems interfere with normal social activities whereas role emotional represents a measure of how emotional problems (depression, anxiety) affect work or regular daily activities. Mental health measures an individual's perception of their levels of depression, anxiety and happiness.

The questionnaire consists of 29 Likert-type response questions that vary in the range of response (1-3, 1-5, and 1-6). The remaining seven questions are answered true or false. The numeric scores are converted as per a scoring key. Low scores indicate a less favorable health state whereas high scores reflect a more favorable health state. Averaged scores in the same scale create the score for each of the eight domains.

Perceived Control of Asthma Questionnaire (PCAQ)

The PCAQ is an 11-item self-administered questionnaire with Likert-type responses on a scale of 1 (strongly agree) to 5 (strongly disagree) that takes approximately 5 min to complete. It identifies how a person with asthma perceives their ability to deal with asthma and its exacerbations in an effective manner (Katz et al., 1997) and is outlined in Appendix D. This questionnaire is simple, fast, and easy to administer and its authors have demonstrated internal consistency (Cronbach a = 0.74) and construct validity (strong correlations to asthma severity, asthma QOL, and generic QOL, $p < .05$) (Katz et al., 1997). The minimal clinically important change in score has not been determined (Personal communication with Dr. P. Katz).

Procedure

KGH is 446-bed teaching hospital affiliated with Queen's University, which provides critical care, trauma care and in-patient services for the Southeastern Ontario region. KGH is a centre that offers a full-service 24-hour Emergency Department along with specialized programs and services. The AEC, which officially opened in January 1999, is located within KGH and provides in-patient as well as outpatient asthma education delivered by a certified asthma educator.

This study utilized a prospective observational design (see Figure 1). Assessments consisted of one interviewer-administered questionnaire (AMQ) and three self-administered questionnaires (AQLQ, PCAQ and SF-36) at their initial visit, one and three months post education. A certified asthma educator (JGO-C) administered the AMQ at the initial needs assessment visit, one month and three months post-education. These questionnaires were part of the routine management of all patients seen in the AEC regardless of whether or not they participated in the study. Each patient acted as his or her own control.

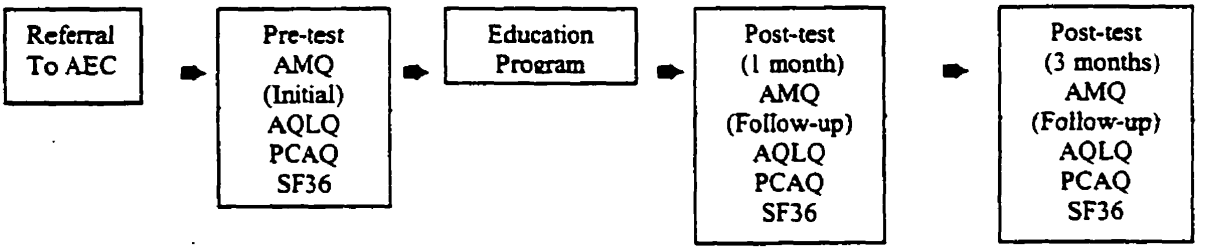

Figure 1. Intervention and data collection time line.

Baseline knowledge of asthma was also assessed at the initial meeting (described in Asthma Education Program). The patient was then given the option to attend group or individual education sessions. The patient was scheduled for one to four sessions according to their educational needs. Once the education was complete, the patient was

given return appointments at one and three month time intervals to repeat the test battery. In the event that the patient was unable to attend any of the scheduled appointments, an attempt was made to administer the questionnaires over the telephone.

Measures of Asthma Severity

There is no agreement as to the optimal way to classify asthma severity (Boulet et al., 1999). An individual with asthma may be classified as mild, however at the time of data collection, they may be experiencing an episode that may classify them as moderately severe. In order to account for the variable nature of the disease, severity of asthma was documented at baseline utilizing a combination of severity measures or algorithms from the Canadian Consensus Guidelines (Boulet et al., 1999) and International Guidelines (NIH, 1995, 1997) and are outlined in Appendix E. Individuals were classified as having mild, moderate or severe asthma. When an algorithm had more than three severity levels the levels were collapsed into mild, moderate or severe.

Asthma control was assessed at baseline according to the Canadian Consensus Guidelines (Boulet et al., 1999). An individual's asthma was considered out of control if they were experiencing daytime symptoms (cough, wheeze, chest tightness or shortness of breath) more than three days per week, using a short-acting β_2-agonist more than 4 times per week to relieve symptoms, or waking at night with symptoms more than 1 night per week. Two independent experts in the asthma field classified severity according to asthma control, the amount of medication they were taking at that time and their percent predicted PEFR. Percent predicted PEFR was calculated utilizing the adult peak flow nomogram by Nunn and Gregg (1973).

Asthma Education Program

Patients referred to the KGH AEC attended one of three different levels of education. Level One education consisted of an initial needs assessment conducted by a Canadian Certified Asthma Educator (JGO-C) that took approximately 45 minutes to complete (described below). Following this assessment, emergency ("Survival Skills") education was provided (i.e., inhaler technique, basic anatomy and physiology of asthma, outlining their medications and recognizing and reacting to asthma symptoms). The average initial session lasted approximately 75 min. If the educational deficits were minimal (determined by the patient and educator) and were adequately addressed following this session the patient did not return for any more education sessions.

Level Two education consisted of Level One education as well as either individual or group asthma education according to the patient's educational and personal needs. The education was based on a program developed by the American Institutes for Research/Kaiser-Permanente Medical Group (1993) specifically for adults. This program utilized behaviour modification strategies based on the Social Cognitive Theory of human behaviour and specifically self-efficacy to enhance self-management skills and promote behaviour change. The content of this program is outlined in Appendix F.

Level Three education consisted of Level One and Level Two education as well as ongoing follow-up as needed. For example, if the patient and/or the asthma educator identified further educational deficits, follow-up was scheduled until these deficits were adequately addressed and rectified. This level was designed to accommodate patients who had severe asthma and/or had multiple barriers to adherence.

CHAPTER 4: RESULTS

Data Analyses

Demographic characteristics of study participants were summarized using descriptive statistics. Independent sample t-tests and chi-squared analyses were used to identify differences in the study participants (those who were followed up at one and three months, $\underline{n} = 37$) and the overall sample (those who participated in the education program but were lost to follow-up at one and three months). Repeated measures analysis of variance was utilized to determine whether significant changes occurred among the study group in generic and asthma-specific QOL. Pearson product-moment correlation tests were used to determine the relation between asthma QOL and perception of control at each time period and the change in score (1 month score – baseline score, 3 month – baseline). Statistical analyses of all the data were conducted with the Statistical Package for the Social Sciences (SPSS) software program and $\underline{p}<0.05$ level was used to determine statistical significance. Greenhouse-geisser was used for repeated measures. Complete data output is presented in Appendix G.

Sample Description

Two hundred and forty-one referrals of asthma patients were received at the KGH AEC between January 1999 and January 2001. Data collection commenced in April 1999 when all four questionnaires became standard assessment tools for the AEC. Patient demographics, health care utilization, peak flows and SF-36 were retrospectively collected (January 1999 to April 1999) on 15 of the 241 patients as part of baseline data for the AEC.

Thirty-seven of the 241 referred patients served as the study group. Forty of the 241 patients did not attend their initial appointment (35 adult and 5 pediatric patients). Initial needs assessments were completed on the remaining 201 referrals. Of these 201, 31 were pediatric referrals (<16 years of age), 2 subjects had exercised-induced asthma, 18 were diagnosed with COPD, 5 did not have the set of four questionnaires completed, 7 did not have objective evidence of asthma, and 1 subject did not consent. Subsequently these subjects were excluded from participating, as they did not meet the eligibility criteria. Of the 201 referrals who completed the initial needs assessment, 137 patients met the eligibility requirements to participate and were considered the remaining eligible sample. Forty-four patients in the remaining eligible sample did not complete the education program (dropped out), 75 completed the program and 18 were still attending the program at the cutoff time for data collection. Of the 75 patients who completed the education program, 37 patients were able to attend their one-month and three-month follow-up appointments (study group). Patient characteristics of the study group ($\underline{n}$=37) and remaining eligible sample ($\underline{n}$=100) are summarized in Table 1.

The study group consisted of mainly female (73%) subjects with severe asthma (67.6%) who had received some form of asthma education (48.6%) in the past (e.g. from pamphlets, videos, internet, physicians, nurses, pharmacists and respiratory therapists). Subjects ranged in age from 21 to 80 years with a mean age of 49.32 (SD = 16.37). The education level of 36 subjects ranged from having completed a university or college education (25.0%), followed by some college or university (22.2%) to grade 8 or below (19.4%). Approximately thirty percent of subjects reported having a combined income level between $40,000 and $59,000 per year. Approximately 24% of the sample reported

an income level less than $20,000 per year. Almost 60% of the subjects were either married or in a common-law relationship. Forty-six percent were employed in a full-time job, while approximately 32% were retired.

Comparison of Study Group to Remaining Eligible Sample

Chi-squared analysis showed that, demographically, the study sample differed significantly from the remaining eligible sample in occupation ($\chi^2(6, \underline{n} = 132)=19.69$, $\underline{p}<.01$), education ($\chi^2(6, \underline{n} = 136)=16.75$, $\underline{p}=.01$), and age group ($\chi^2(3, \underline{n} = 137)=9.09$, $\underline{p}<.05$). No differences were found in income level ($\chi^2(4, \underline{n} = 120)=4.46$, NS), marital status ($\chi^2(4, \underline{n} = 132)=5.48$, NS), gender ($\chi^2(1, \underline{n} = 137)=.133$, NS) or severity ($\chi^2(2, \underline{n} = 136)=3.60$, NS).

Baseline PCAQ, PEFR and health care utilization are summarized in Table 2. Independent samples t-test indicated that the study group had fewer emergency room visits than the remaining eligible sample in the previous 12 months ($\underline{p}<.01$). There were no differences found in initial PEFR or other measures of health care utilization.

The AQLQ and the Rand SF-36 baseline data are summarized in Tables 3 and 4 respectively. The study group showed a statistically significant higher score than the remaining eligible sample in the emotional function domain of the AQLQ ($\underline{p}<.05$). No differences were found in the PCAQ, SF-36 or in any of the remaining domains in the AQLQ.

Table 1

Chi-square Analyses to Examine Differences between the Study Group and Remaining Eligible Sample on Demographic Characteristics

Characteristic	Study Group %	Eligible Sample %	p value
Gender	n=37	n=100	NS
Male	27.0%	24.0%	
Female	73.0%	76.0%	
Age	n=37	n=100	<.05
16-27	10.8%	30.0%	
28-39	24.3%	26.0%	
40-54	24.3%	25.0%	
55+	40.5%	19.0%	
Education	n=36	n=100	.01
Grade 8 or below	19.4%	1.1%	
Some High School	16.7%	22.8%	
High School Graduate	13.9%	13.0%	
Technical Training	2.8%	7.6%	
Some College or University	22.2%	22.8%	
College or University Graduate	25.0%	29.3%	
Post Graduate Study	0.0%	3.3%	
Income Level	n=33	n=87	NS
Less than $20,000	24.2%	29.9%	
$20,000 - $39,000	21.2%	16.1%	
$40,000 - $59,000	30.3%	20.7%	
$60,000 - $79,000	15.2%	10.3%	
$80,000 or more	9.1%	23.0%	
Marital Status	n=37	n=95	NS
Never Married	16.2%	33.7%	
Married/Common-law	59.5%	53.7%	
Separated	5.4%	3.2%	
Divorced	10.8%	6.3%	
Widowed	8.1%	3.2%	
Occupation	n=37	n=95	<.01
Full-time	45.9%	40.0%	
Part-time/Seasonal	2.7%	14.7%	
Self Employed	5.4%	1.1%	
Homemaker	0.0%	9.5%	
Student	2.7%	13.7%	
Receive Disability/Family benefits	10.8%	7.4%	
Other	32.4%	13.7%	

Table 2

Independent Samples t-test to Compare PCAQ, PEFR and Health Care Utilization between Study Group and Remaining Eligible Sample

Characteristic	Study Group Mean (SD)	n	Eligible Sample Mean (SD)	n	Difference p value
PCAQ	38.71 (4.22)	36	37.34 (5.94)	58	NS
PEFR (L/min)	345.48 (108.48)	31	376.15 (109.55)	65	NS
PEFR (% predicted)	71.12 (19.24)	31	75.40 (18.68)	65	NS
Regular Doctor Visits	0.32 (0.38)	36	0.22 (0.28)	93	NS
Unscheduled Doctor Visits	0.21 (0.40)	36	0.32 (0.76)	93	NS
Regular Specialist Visits	0.07 (0.17)	37	0.06 (0.08)	94	NS
Unscheduled Specialist Visits	0.01 (0.04)	37	0.00 (0.00)	95	NS
Hospital Admissions	0.04 (0.10)	37	0.03 (0.10)	94	NS
Emergency Visits	0.05 (0.09)	37	0.14 (0.18)	94	<.01

Note. Visits and hospital values represent the average number of visits per patient per month calculated over the previous 12 months from baseline.

Table 3

Independent Samples t-test to Compare Rand SF-36 Scores between Study Group and Remaining Eligible Sample at Baseline

Domain	Study Group Mean (SD)	n	Eligible Sample Mean (SD)	n	Difference p value
Physical Functioning	63.97 (28.55)	34	63.28 (23.79)	82	NS
Role Physical	34.29 (40.71)	35	42.99 (41.07)	82	NS
Bodily Pain	55.57 (30.45)	35	62.24 (26.65)	82	NS
General Health	51.79 (19.43)	37	48.19 (22.66)	97	NS
Vitality	44.10 (21.54)	35	40.81 (21.84)	82	NS
Social Functioning	64.64 (28.03)	35	58.69 (30.22)	82	NS
Role Emotional	46.67 (43.69)	35	55.97 (45.29)	81	NS
Mental Health	65.83 (21.17)	35	65.63 (21.10)	82	NS

Table 4

Independent Samples t-test to Compare AQLQ Scores between Study Group and Remaining Eligible Sample at Baseline

Domain	Study Group (n=36) Mean (SD)	Eligible Sample (n=59) Mean (SD)	Difference p value
Total Score	4.35 (1.16)	4.00 (1.25)	NS
Activity Limitations	4.08 (1.04)	3.85 (1.20)	NS
Emotional Function	4.60 (1.52)	3.90 (1.55)	<.05
Exposure to Environmental Stimuli	3.46 (1.26)	3.12 (1.10)	NS
Symptoms	4.85 (1.55)	4.55 (1.73)	NS

Generic Quality of Life of the Study Group

Rand 36-Item Health Survey (SF-36)

Baseline SF-36 scores of the study group were initially compared to Canadian normative data (Figure 2). The Canadian normative data represents a random survey sample (n = 9423) of the general population including healthy individuals as well as those with illness. The study group scored well below Canadian norms (Hopman et al., 2000). The SF-36 data summarizing the eight domains at each time period are presented in Table 5. Overall, five out of the eight domains showed a significant increase in their health state score. Physical functioning (n=33), role physical (n=34), bodily pain (n=34), vitality (n=33), and role emotional (n=34) were the domains that showed a significant improvement at the $p<.01$ level. The domains that did not show a significant increase were mental health, social functioning, and general health. Despite improvement, the study group remained below Canadian norms after three months. Repeated measures analysis of variance determined no interaction between gender, age or marital status (see Appendix G Tables G5 – G68).

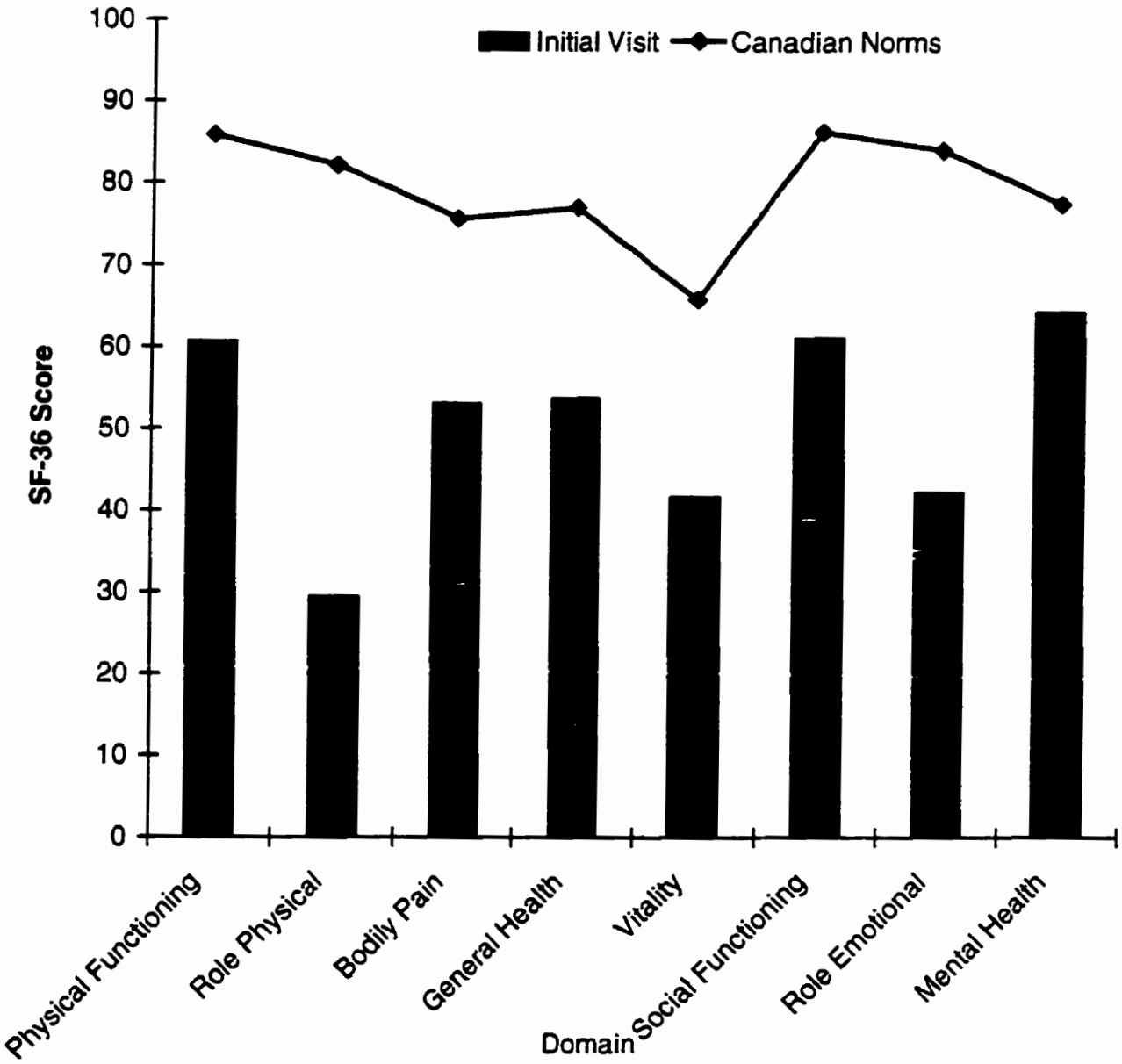

Figure 2. Comparison of baseline generic quality of life (SF-36) to Canadian normative data.

Table 5

Repeated Measures ANOVA of Study Group SF-36 Scores at Baseline, One-month and Three-months Post Education (n=33)

Domain	Baseline Mean (SD)	One-Month Mean (SD)	Three-Month Mean (SD)	p value
Physical Functioning	60.61(30.71)	66.16(29.40)	72.12(26.78)	<.01
Role Physical	29.41(38.17)	51.47(42.61)	55.15(42.09)	<.01
Bodily Pain	53.03(30.62)	60.82(30.38)	70.82(26.91)	.001
General Health	53.66(20.09)	60.17(22.00)	63.58(23.74)	NS
Vitality	41.62(22.24)	50.15(24.38)	56.62(23.12)	.001
Social Functioning	61.03(29.48)	67.65(31.10)	73.53(25.52)	NS
Role Emotional	42.16(42.88)	66.67(35.77)	77.45(38.24)	<.001
Mental Health	64.30(20.22)	70.18(18.17)	70.61(19.74)	NS

Asthma-specific Quality of Life of the Study Group

Asthma Quality of Life Questionnaire (AQLQ)

The AQLQ scores are summarized in Table 6. The mean scores for each of the four domains, along with the overall score, showed clinically and statistically significant ($p<.001$) improvements. There was no interaction between gender, age or marital status (see Appendix G Tables G69 – G102).

The total AQLQ score for the study group showed a moderately important improvement of 1.10 post education. The scores for activity limitation and exposure to environmental stimuli both demonstrated small but clinically important changes over time (.94 and .63 respectively). Finally, the change in symptom score of 1.35 showed a moderately important improvement.

Perceived Control of Asthma Questionnaire (PCAQ)

To determine whether perceived control of asthma improved for adults participating in a behaviour based asthma education program change in PCAQ scores were examined (see Table 7). Repeated measures ANOVA showed a statistically significant improvement in the study group in total score over time ($p<.001$). There was no interaction between gender, age or marital status (see Appendix G Tables G103 – G108).

Table 6

Repeated Measures ANOVA of Study Group AQLQ Scores at Baseline, One-month and Three-months Post Education (n=34)

Domain	Baseline Mean (SD)	One-Month Mean (SD)	Three-Month Mean (SD)	p value
Total Score	4.24(1.17)	5.16(1.17)	5.34(1.13)	<.001
Activity Limitations	3.97(1.01)	4.74(1.23)	4.91(1.20)	<.001
Emotional Function	4.43(1.55)	5.45(1.47)	5.72(1.14)	<.001
Exposure to Environmental Stimuli	3.35(1.29)	4.13(1.03)	3.98(1.16)	<.001
Symptoms	4.78(1.59)	5.85(1.53)	6.13(1.51)	<.001

Table 7

Repeated Measures ANOVA of Study Group PCAQ Scores at Baseline, One-month and Three-months Post Education (n=36)

Domain	Baseline Mean (SD)	One-Month Mean (SD)	Three-Month Mean (SD)	p value
Total Score	38.51(4.55)	42.50(6.19)	43.07(6.39)	<.001

Perception of Control of Asthma and QOL

To determine if there was a positive association between perception of control for adult patients participating in a behaviour based asthma education program and generic and disease-specific QOL, correlations of PCAQ scores with both AQLQ and SF-36 scores at baseline, one-month and three-months post-education were calculated. In order to determine the strength of the correlation between scores, the individual change in score in QOL for each subject was correlated with the change in PCAQ score for each subject at each time interval. The change in score was calculated by subtracting the baseline from one-month and baseline from three-month score. The calculation resulted in two scores per questionnaire.

The Relation between PCAQ and AQLQ

Pearson product-moment correlations for PCAQ and AQLQ at baseline, one-month, and three-months are presented in Tables 8, 9, and 10 respectively. There were no significant relations between PCAQ and AQLQ scores at baseline (see Table 8). At one-month (see Table 9) however, the PCAQ score was significantly related with the symptom score ($p < .05$) and the total AQLQ score ($p < .05$). At three-months (see Table 10), significant relations remained with symptoms ($p < .01$) and total AQLQ score ($p < .05$). A significant relation was also found with environmental stimuli ($p < .05$). The PCAQ was related at the three-month time period to emotional functioning ($p < .001$). PCAQ was not significantly related to the activity limitation domain score at any of the 3 time periods.

Table 8

Pearson Product-moment Correlation Coefficients for PCAQ Score and AQLQ Score at Baseline (n=36)

	PCAQ	Symptoms	Activity Limitations	Emotional Functioning	Environmental Stimuli	AQLQ Total Score
PCAQ						
Symptoms	.149					
Activity Limitations	.303	.778**				
Emotional Functioning	.051	.723**	.698**			
Environmental Stimuli	.202	.449**	.586**	.443**		
AQLQ Total Score	.209	.934**	.920**	.836**	.633**	

Note. *p< 0.05; **p< 0.01.

Table 9

Pearson Product-moment Correlation Coefficients for PCAQ Score and AQLQ Score at One Month (n=35)

	PCAQ	Symptoms	Activity Limitations	Emotional Functioning	Environmental Stimuli	AQLQ Total Score
PCAQ						
Symptoms	.349*					
Activity Limitations	.311	.668**				
Emotional Functioning	.177	.644**	.617**			
Environmental Stimuli	.313	.189	.384*	.319		
AQLQ Total Score	.363*	.896**	.896**	.795**	.425*	

Note. *$p < 0.05$; **$p < 0.01$; [a] $n = 36$

Table 10

Pearson Product-moment Correlation Coefficients for PCAQ Score and AQLQ Score at Three Months (n=35)

	PCAQ	Symptoms	Activity Limitations	Emotional Functioning	Environmental Stimuli	AQLQ Total Score
PCAQ						
Symptoms	.490**					
Activity Limitations	.114	.669**				
Emotional Functioning	.587**	.698**	.521**			
Environmental Stimuli	.417*	.626**	.484**	.645**		
AQLQ Total Score	.424*	.930**	.860**	.781**	.725**	

Note. *$p < 0.05$; **$p < 0.01$; [a] $n = 36$

The Relation between PCAQ and SF-36

Correlations between PCAQ and SF-36 for baseline, one-month and three-month scores are summarized in Tables 11, 12 and 13 respectively. At baseline (see Table 11), PCAQ was significantly related to only one domain of the SF-36, role physical ($p < .05$). At one-month (see Table 12), however, this relation no longer significant. Instead, PCAQ was significantly related to physical functioning ($p < .01$) vitality ($p < .05$) and general health ($p < .001$). At three months (see Table 13), PCAQ was related to general health ($p < .05$) role physical ($p < .01$) and mental health ($p < .05$).

Table 11

Pearson Product-moment Correlation Coefficients for PCAQ Score and SF-36 Score at Baseline (n=36)

	PCAQ	PF	RP	BP	GH	VT	SF	RE	MH
PCAQ									
PF	.134[b]								
RP	.407[a]**	.311							
BP	.169[a]	.277	.486**						
GH	.022	.087	.008	.113					
VT	.213[a]	.516**	.636**	.580**	.044				
SF	.316[a]	.548**	.594**	.610**	.036	.559**			
RE	.176[a]	.252	.617**	.720**	.095	.701**	.446**		
MH	.021[a]	.185	.413*	.498**	.099	.780**	.395*	.672**	

Note. *$p < 0.05$; **$p < 0.01$. PF = physical functioning; RP = role physical; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role emotional; MH = mental health; [a] $n = 35$, [b] $n = 34$.

Table 12

Pearson Product-moment Correlation Coefficients for PCAQ Score and SF-36 Score at One Month (n=34)

	PCAQ	PF	RP	BP	GH	VT	SF	RE	MH
PCAQ									
PF	.461**								
RP	.273	.463**							
BP	.238	.500**	.578**						
GH	.632**	.374*	.591**	.397*					
VT	.353*	.568**	.729**	.578**	.591**				
SF	.240	.327	.600**	.348*	.656**	.521**			
RE	.071	.201	.722**	.200	.307	.320	.412*		
MH	.323	.290	.576**	.377*	.643**	.743**	.461**	.486**	

Note. *p< 0.05; **p< 0.01. PF = physical functioning; RP = role physical; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role emotional; MH = mental health.

Table 13

Pearson Product-moment Correlation Coefficients for PCAQ Score and SF-36 Score at Three Months(n=34)

	PCAQ	PF	RP	BP	GH	VT	SF	RE	MH
PCAQ									
PF	.129								
RP	.452**	.519**							
BP	.255	.616**	.297						
GH	.430*	.556**	.269	.410*					
VT	.212[a]	.588**	.397*	.550**	.602**				
SF	.293	.419*	.370*	.504**	.537**	.733**			
RE	.271	.162	.212	.183	.237	.534**	.561**		
MH	.495[a]**	.371*	.276	.456**	.480**	.754**	.555**	.579**	

Note. *p< 0.05; **p< 0.01. PF = physical functioning; RP= role physical; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role emotional; MH = mental health; [a] n = 33.

The Relation between Changes in Score of PCAQ and AQLQ

The summary of correlation coefficients for change in PCAQ score and AQLQ score from baseline to one month and baseline to three months are presented in Tables 14 and 15 respectively. As can be seen in Table 14, change in PCAQ score was significantly related to change in total AQLQ score ($p < .05$) and to change in symptom score ($p < .01$) from baseline to one month. Table 15 shows that change in PCAQ score from baseline to three months was significantly related to change in total AQLQ score ($p < .05$), change in symptom score ($p < .01$), and change in emotional functioning score ($p < .05$).

The Relation between Changes in Score of PCAQ and SF-36

Tables 16 and 17 summarize the relation between changes in scores of the PCAQ and the SF-36 from baseline to one month and three months respectively. Table 16 shows that small but significant relations were present between change in PCAQ score with change in physical functioning score ($p<.05$), change in bodily pain score ($p < .05$), and change in general health score ($p<.05$) from baseline to one month. Table 17 shows that change in PCAQ score from baseline to three months was significantly related to change in bodily pain score ($p<.05$) and change in social functioning score ($p<.05$).

Table 14

Pearson Product-moment Correlation Coefficients for Changes in PCAQ Score and AQLQ Score from Baseline to One Month (n=34)

	PCAQ	Symptoms	Activity Limitations	Emotional Functioning	Environmental Stimuli	AQLQ Total Score
PCAQ						
Symptoms	.481**					
Activity Limitations	.308	.694**				
Emotional Functioning	.284	.804**	.685**			
Environmental Stimuli	-.073	.285	.172	.374*		
AQLQ Total Score	.405*	.948**	.852**	.892**	.381*	

Note. *$p < 0.05$; **$p < 0.01$; [a] $n = 35$

Table 15

Pearson Product-moment Correlation Coefficients for Changes in PCAQ Score and AQLQ Score from Baseline to Three Months (n=34)

	PCAQ	Symptoms	Activity Limitations	Emotional Functioning	Environmental Stimuli	Total AQLQ
PCAQ						
Symptoms	.443**					
Activity Limitations	.264	.741**				
Emotional Functioning	.414*	.853**	.691**			
Environmental Stimuli	.214	.561**	.314	.519**		
Total AQLQ	.410*	.964**	.866**	.902**	.580**	

Note. *$p < 0.05$; **$p < 0.01$; [a] $n = 35$

Table 16

Pearson Product-moment Correlation Coefficients for Changes in PCAQ and SF-36 Score from Baseline to One Month (n=34)

	PCAQ	PF	RP	BP	GH	VT	SF	RE	MH
PCAQ									
PF	.389[b]*								
RP	.146[a]	.103							
BP	.362[a]*	.018	.381*						
GH	.350*	.206	.245	.183					
VT	.048[a]	.310	.606**	.401*	.239				
SF	.205[a]	.177	.387*	.338	.341	.329			
RE	.003[a]	.203	.471**	.304	.122	.392*	.173		
MH	-.041[a]	.170	.336	.270	.302	.703**	.292	.571**	

Note. *$p < 0.05$; **$p < 0.01$. PF = physical functioning; RP = role physical; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role emotional; MH = mental health; [a] $n = 33$, [b] $n = 32$.

Table 17

Pearson Product-moment Correlation Coefficients for Changes in PCAQ and SF-36 Score from Baseline to Three Months (n=34)

	PCAQ	PF	RP	BP	GH	VT	SF	RE	MH
PCAQ									
PF	.237[a]								
RP	.286	.419*							
BP	.385*	.310	.479**						
GH	.285	.144	.053	.334					
VT	.074[a]	.356*	.549**	.385*	.127				
SF	.427*	.273	.564**	.699**	.072	.479**			
RE	.142	-.069	.444**	.217	.006	.418*	.254		
MH	.160[a]	.191	.448**	.167	.223	.730**	.349*	.505*	

Note. *$p < 0.05$; **$p < 0.01$. PF = physical functioning; RP= role physical; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role emotional; MH = mental health; [a] $n = 33$

Peak Expiratory Flow Rate (PEFR)

Baseline, one-month and three-month PEFR's and percent predicted PEFR's are summarized in Table 18. Repeated measures ANOVA showed a significant improvement in both PEFR and percent predicted PEFR. Again, there was no interaction between gender, age or marital status (see Appendix G Tables G109 – G124).

Table 18

Repeated Measures ANOVA of PEFR and Percent Predicted PEFR at Baseline, One-month and Three-months Post Education (n=25)

	Baseline Mean (SD)	One-Month Mean (SD)	Three-Month Mean (SD)	p value
PEFR (L/min)	363.20 (103.25)	395.20 (106.72)	399.60 (115.40)	<.05
PEFR (% pred)	74.25 (17.94)	80.68 (17.27)	81.18 (18.06)	<.05

CHAPTER 5: DISCUSSION

The purpose of this study was to determine the impact of a behaviour based adult asthma education program on QOL and to determine if any relation existed between QOL and perception of control. This study has demonstrated clinically and statistically significant improvements in asthma-specific QOL and generic QOL following completion of a behaviour based adult asthma education program. The study also showed mild to moderate relations between PCAQ and some domains of generic and asthma-specific QOL.

Differences in characteristics between those who completed the program and those who attended once were noted and provide insight into barriers to attendance. The study group was predominantly female, slightly older, less educated with more retirees or those working full-time than the remaining eligible sample. These demographic characteristics are in keeping with published reports that non-attenders at ambulatory asthma education programs are typically single males (Kolbe, 1999; Yoon, McKenzie, Miles, & Baydur, 1991). The study group also had fewer emergency visits at baseline than the remaining eligible sample indicating those with more severe disease may be less likely to attend. In response to the number of non-attenders at the KGH AEC, a study is currently underway in order to identify characteristics of non-attenders.

There were no differences between groups at baseline in generic QOL however the study group had a slightly higher emotional functioning score than the remaining eligible sample. It would appear that the study group was less concerned or frustrated over having asthma and the need to use their medications. It would also appear that the

study group experienced less fear in experiencing shortness of breath or having their medications available.

These study group characteristics may have reflected their availability to attend the AEC. Working part-time and the responsibilities associated with being younger (i.e., having young children and day care) may have posed a barrier for those not attending the education sessions. The study may not have captured those who may have benefited the most from asthma education (there were higher emergency visits among the remaining eligible sample at baseline). If anything, we would expect an even greater improvement in patients with more severe asthma. The study therefore may have underestimated the potential benefit of the education program.

The hypothesis that QOL would improve was partially supported with regards to generic QOL. At baseline, QOL for patients with asthma in this study were more affected than the general Canadian population (Hopman et al., 2000). Improvements were seen in five of eight domains in the SF-36: physical functioning, role physical, bodily pain, vitality and role emotional. Despite improvements, QOL for patients with asthma in this study remained below Canadian normative data after three months (Hopman et al., 2000). One can speculate that further improvements may be seen over time.

The most profound changes were seen in the role emotional and role physical domains. Kelso et al. (1996) reported similar results after an educational intervention was implemented in adult African-Americans with asthma. The researchers found significant improvements in all but the physical functioning and bodily pain domains. It

is difficult, however to compare results due to the characteristics of the sample in the study. In future, similar studies need to be performed including a more diverse sample.

Significant changes were not seen in the mental health, social functioning or the general health domains. This may be partially explained by the nature of the instrument. A generic QOL instrument can encompass other factors involved in a person's life that may affect their overall QOL. For example, comorbid conditions could have been a factor that may have affected the general health score. However, serious comorbid conditions would have been present at both time periods. Comorbid conditions were not identified for this thesis so it was not possible to determine if this was actually a confounder.

Mental health was another domain of the SF-36 in which no significant improvements were seen. One can speculate that depression or certain personality traits could have limited any improvement over the duration of the study. Mancuso, Peterson and Charlson (2000) support this premise as they identified that depressive symptoms can affect QOL. Also, the tendency to experience negative emotions (i.e., depression, anxiety and irritability) has been shown to influence asthma QOL (Put, Demedts, Van Den Bergh, Demyttenaere, & Verleden, 1999). The intervention used in this study did not address specific methods to improve mental health. If psychosocial issues were identified during any of the education sessions they were subsequently identified as factors that could contribute to the individual's overall well being as well as related to asthma. Detailed discussions were limited by time as well as the educator's attempt to focus the discussion on the primary purpose: asthma management. Brief counselling was implemented and appropriate referrals were recommended. In order to determine if

psychosocial issues were a factor, future studies need to include measures of depression and personality traits.

After attending the education program, patients had fewer difficulties with work and other activities of daily living as a result of their physical health. It would also appear they were less affected in their everyday activities and work as a result of their emotional problems. These were the most profound changes seen in generic QOL. In addition, patients were less limited in their physical activity such as climbing stairs or walking, less limited due to bodily pain and they felt less tired and had more energy from baseline to three months after initial assessment.

The hypothesis was fully supported with regards to asthma-specific QOL. Improvements were seen in all four domains as well as the total asthma QOL score. The most profound changes were seen in the symptom score. The patients were less affected by their symptoms such as shortness of breath, wheezing, cough, chest tightness or waking at night or early in the morning due to asthma. These results replicate other studies implementing an asthma education program (Boulet et al., 1995; Côté et al., 2000; Moudgil, Marshall, & Honeybourne, 1999; Turner et al., 1998).

Subjects' limitations due to symptoms decreased substantially. Treatment optimization alone could have accounted for such an improvement in the symptom score, as the majority of patients were uncontrolled at the initial visit according to Canadian Consensus Guidelines criteria for control (Boulet et al., 1999). Recommendations, such as an alteration in their medication regime, were made to the referring physician following the initial visit in an effort to improve control. Although treatment optimization could have accounted for improved symptom score, Côté et al. (1997, 2000)

found significant improvements in QOL following an asthma education program even after treatment optimization. This supports the premise that improved QOL may be due to other factors in addition to treatment optimization.

Emotional functioning improved from being limited some of the time to being limited hardly any of the time over the study period. The patients with asthma felt less concerned or frustrated with having asthma or using their asthma medications and less afraid of not having their medications available or getting out of breath after the education program. One possible explanation for this could be an increase in self-efficacy. Methods such as behavioural contracting, goal setting and encouragement to identify and express problem areas were utilized as part of the education program. The overall aim of these strategies was to improve self-efficacy, which could translate into improved self-management skills (Buchmann, 1997). Of course, self-efficacy was not measured and this explanation is tentative. Future studies should include measures of asthma self-efficacy in order to determine what effect self-efficacy has on asthma self-management.

Significant improvements were seen in the environmental and activity domains. Patients were less limited in their personal activities as a result of their asthma and felt less of a need to avoid social situations or certain environments for fear of being exposed to triggers such as dust, pollen, air pollution, cigarette smoke and strong smells. Also, they experienced fewer symptoms as a result of being exposed to such triggers. This may have been due to incorporating basic self-management skills as pre-medicating prior to exposure to triggers and/or being aware of ways to manage an asthma exacerbation.

Although this data was not scientifically collected and analyzed, this was often the case reported by the patient at follow-up visits.

Although significant improvements were seen in the environmental and activity domains, a greater improvement may have been limited by a few factors. Research has shown that educational efforts are usually ineffective in reducing environmental allergen exposure (Wilson, 1993). Individuals realize their detrimental effects. However, strategies to reduce their exposure may be too costly, both financially and personally. Often, those who test positive to cat or dog and have a pet in the house are reluctant to remove the pet. Anecdotally, this was often the case with individuals seen in the AEC. Dust mite exposure is also a difficult environmental allergen to control. The usual recommendations are encasement of the mattress and pillow in a specialized dust mite free cover and removal of carpets in the house. These measures were financially challenging for most individuals seen in the AEC. The individual with asthma usually weighs the benefits versus the costs of implementing such measures and unfortunately the majority choose not to due to cost. Therefore, greater improvements may have been limited by sub-optimal environmental control.

Larger improvements in the activity domain may have been limited by various factors as well. Individuals with asthma are often limited in their physical activity due to their asthma not being optimally controlled (Vollmer et al., 1999). Living with symptoms on a daily basis may condition the individual to lower their activity to a level that does not induce asthma symptoms. Although symptoms, and therefore overall asthma control, may improve, individuals with asthma may be afraid of challenging themselves. Activities that have provoked symptoms previously may still be avoided for

fear of initiating an attack. Also, due to such a limitation in activities, being physically unfit may be the only limiting factor. It may sometimes be difficult for the individual with asthma to distinguish between symptoms associated with asthma with those from being physically unfit (e.g. shortness of breath). Anecdotally, this was often the case with the individuals seen in the AEC.

In summary, asthma-specific QOL improved in all four separate domains as well as overall QOL. The most substantial changes were seen in the symptom domain. The patients were less affected by their symptoms such as shortness of breath, wheezing, cough, chest tightness or waking at night or early in the morning due to asthma. They were less limited in their personal activities as a result of their asthma. The patients also felt less of a need to avoid social situations or certain environments for fear of being exposed to triggers such as dust, pollen, air pollution, cigarette smoke and strong smells. Also, they experienced fewer symptoms as a result of being exposed to such triggers.

Perceived control of asthma increased and was maintained over the two time periods. After the education program, patients with asthma were better able to identify factors over which they had control. There is however, a lack of literature to assist in explaining or supporting the reasons behind the change in patient's perception of control of their asthma. The instrument utilized in this study was recently developed (Katz et al., 1997), therefore the rationale for change in perception of control is hypothetical.

One might speculate that self-efficacy (Bandura, 1986, 1997) explains changes in perceived control. The education program addressed key aspects to increase an individual's self-efficacy with asthma self-management. Four efficacy-enhancing mechanisms were utilized within the education program: skills mastery, modeling,

reinterpretation of physiological signs and symptoms, and social persuasion (Bandura, 1997; Goeppinger & Lorig, 1995). The program provided, in addition to knowledge, ways and means to practice new self-management strategies to help improve self-efficacy and subsequently, control. This was evident through use of their personalized Asthma Action Plan, which provides the individual with asthma with written instructions on how to react and manage their asthma when it gets out of control. Learning what a person can and cannot control may also improve subjects' confidence levels.

By clarifying that asthma is a disease characterized mainly by inflammation that cannot be cured but can be controlled in most individuals, subjects were helped to reinterpret physiological signs and symptoms. Improving control with regular use of their preventer* medication helped individuals realize that they did not have to live with symptoms on a daily basis. Persuasion was instituted in the education program through setting small measurable goals that assisted the individual with asthma in realizing the extent to which they had control. For example, individuals were asked to use their preventer* medication regularly for a short period of time to see if any improvement occurred. The goal was to decrease asthma symptoms through control of inflammation. Once this goal was obtained, the results provided positive feedback and may have increased the individual's self-efficacy with self-management techniques.

In order to enhance self-efficacy and subsequently perceived control, skills mastery was encouraged. The education program was individualized and built on each subject's previous knowledge. Each skill was broken down into smaller, more manageable tasks. Once the task was accomplished the next skill was addressed. The

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* An inhaled corticosteroid used daily to control inflammation and prevent asthma symptoms

final component of the education program was delivered through use of an asthma action plan. Each subject's action plan provided written instructions regarding medication adjustment according to their asthma symptoms and/or peak flows. The patient with asthma was able to make decisions based on skills and knowledge obtained and mastered through the education program. This plan gave the patient the control to react to their asthma flaring by adjusting their own medication regime.

The hypothesis that there would be a positive linear relation between asthma-specific QOL and perceived control of asthma was partially supported. There was no relation between PCAQ and AQLQ at baseline. At one month PCAQ was associated with the symptom domain as well as the total AQLQ score. This may be interpreted that as their perceived control increased, study subjects were not as bothered by their symptoms and their overall asthma QOL increased. At the three-month interval, PCAQ was related to all of the domains except for activity limitations. Not being bothered as much by their asthma symptoms and feeling less concerned or frustrated with having asthma increased with their perception of control. Also, as PCAQ increased the patients with asthma experienced fewer symptoms as a result of being exposed to environmental triggers and had an overall increase in asthma QOL

Change in PCAQ score was also related to changes in both generic and disease specific QOL scores. Change in PCAQ from baseline to one month was associated with generic QOL in the physical functioning, bodily pain and general health. Change in PCAQ from baseline to three months was associated with bodily pain and social functioning. As the patient with asthma's perception of control increased their ability to perform activities without being limited increased, they experienced less pain, felt

generally healthier and were not as limited socially by their physical and emotional status.

Change in PCAQ score from baseline to one month and baseline to three months was associated with the symptom and the total score of the AQLQ. Change in emotional functioning score was associated with change in PCAQ score from baseline to three months. As the patient with asthma's perception of control increased their time being bothered by their symptoms decreased, they were not as limited socially with regards to their asthma and generally had a better overall asthma QOL.

The hypothesis that there would be a positive linear relation between generic quality of life and perceived control of asthma was partially supported. The only relation present at the initial visit was between PCAQ and the SF-36 role physical domain, which represented problems subjects had with work or other daily activities as a result of their physical health. It would appear that poor control and poor physical activity went hand in hand. At one month however, this relation was no longer significant and PCAQ was positively related to improved physical functioning, vitality and general health. It would appear that as the patients' perception of their control increased their reported physical limitations decreased (represented by higher scores on PF), their energy increased and they had an overall more positive perception of their general health. At three months, the relation between role physical (less difficulty with work and activities of daily living) appeared again and PCAQ was associated with positive mental health. As subjects' perceived control increased so did their feelings of happiness and they had less feelings of nervousness and depression.

These results are partially supported by Katz et al. (1997) during the development of the PCAQ. The author found a relation between perceived control and emotional functioning, physical functioning, mental health and perceived health. One can speculate that as the individual with asthma developed a better understanding of the disease and methods to control it, they were able to implement self-management strategies to improve asthma control. Because the concept of perceived control and the PCAQ is relatively new, there are no other studies published to support or refute the data. Therefore, there is a need for further replication across sites. Future studies need to be conducted incorporating the PCAQ and QOL measures in order to provide an explanation of these relations.

Possible rationales for the study findings were presented in this chapter. The study group had some unique characteristics, different from the larger sample. Members of the study group who participated in an individualized asthma education program based on principles of self-efficacy showed improvement in some domains of generic and asthma-specific QOL over time. Subjects' perceived control of asthma increased and was maintained over time.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Implementation of a behaviour based adult asthma education program in this study improved asthma-specific QOL, perception of control and most domains of generic QOL. This study also demonstrated that perceived control was related to some domains of both generic and disease-specific QOL. Bandura's Social Cognitive Theory (1986, 1997), specifically strategies to enhance self-efficacy, provided the framework for the educational intervention. Bandura (1997) proposed that in order to maintain QOL in a chronic disease, one has to exercise control over their disease. Denial or expectations for suffering can hinder QOL therefore education should be directed towards optimal self-management rather than cure.

Limitations

The correlations reported in this study indicate associations and do not infer a causal effect. As mentioned previously, the PCAQ is a new questionnaire looking at control from the patient's perspective. There is a limited amount of research in this area and future studies utilizing this tool will provide more evidence to support or refute these results.

Several obstacles were encountered during the course of the study. PEFR was one of the objective measures used to identify the level of obstruction present at each visit that assisted classification of disease severity. Part way through data collection, a hospital policy change was instituted which prevented the AEC from using disposable mouth pieces on the peak flow meter. The AEC was therefore unable to routinely collect objective measures unless the individual with asthma brought in their own personal peak

flow meter. This accounted for the majority of missing data on PEFR and contributed to the difficulty in assessing asthma severity.

Other factors contributing to the challenge of classification of asthma severity were the algorithms utilized to document severity. Due to the criteria listed for each algorithm (i.e., before medication or medication required to control symptoms), combinations of algorithms were employed. When an individual's objective measurement (% predicted PEFR) was not available, classification relied solely on medication, however the majority of individuals were not controlled at the initial visit. Assumptions had to be made as to the amount of medication that would be required to obtain control. In an effort to increase reliability of this classification method, two independent specialists in the area of asthma classified subjects that resulted in 82% agreement. Through this classification process, the majority of the study group was grouped as severe. Therefore the data was skewed and analyses could not be conducted between severity groups.

Loss to follow-up was great with this study. The time frame established for the study protocol did not allow for a lot of leeway at each time point. If an appointment was cancelled or not attended, attempts were made to administer the questionnaires over the telephone, however this was not always possible. The time taken to complete all four education sessions varied considerably between individuals. Attempts to accommodate schedules, out of town referrals, cancellations and appointment restrictions within the AEC contributed to the variability. Group sessions were on set dates and were the most consistent with regards to a time frame. Even then, some individuals were not able to commit to all four education sessions and had to be accommodated on an individual

basis. As a result of the loss to follow up and length of education sessions, the size of the study group was small.

Recommendations

The study results demonstrated that QOL and perceived control improved in a select group of adults with asthma. In order to determine if these effects were the result of the behaviour based asthma education program, future studies should include a control group for comparison.

Specialized nursing care in the area of asthma is evolving through certification programs that incorporate behaviour modification techniques. These programs provide the opportunity for nurses to become experts in the area of asthma and to assist in disseminating asthma practice guidelines. Currently, there is a deficiency of certified asthma educators and asthma education centres in Canada. More of these centers will enable nurses to excel in asthma care through education.

Nurses can contribute to improvement in asthma outcomes during their initial contact with individuals with asthma. Whether it is in the emergency department, an outpatient clinic or during a home visit, the nurse can provide basic "survival skills" education. "Only if knowledge of what to do is present, can self-efficacy expectancies start to play a role" (van der Palen, Klein, & Seydel, 1997, p. S41). By initiating this education and referring to the appropriate resources (i.e. local asthma educator) nurses can assist in the self-efficacy process. The Registered Nurses' Association of Ontario has recognized this opportunity and is developing a Best Practice Guideline that will be piloted to assist nurses in this role; Adult Asthma Care Guidelines for Nurses: Promoting Control of Asthma (Registered Nurses' Association of Ontario, 2001).

One of the aims of treating patients should be to enable them to feel better and to function better in their day-to-day activities. Many clinicians and clinical investigators now recognize the importance of incorporating health-related QOL measures into routine clinical practice and clinical studies. The focus should no longer be solely on the physiological aspects of a chronic disease but on what is important for the individual suffering from that illness.

Future Research

Both generic and disease-specific QOL appear to be valid outcome measures. Therefore, future researchers may wish to evaluate the impact that specific interventions have on QOL.

The current study was unable to report on characteristics of patients who did not attend the initial needs assessment even though these individuals were identified by their referring physician as requiring education. The question remains why did these individuals choose not to attend? Is it possible to identify barriers to attendance at asthma education programs that can be overcome in order to improve attendance?

Only one study was identified which looked at general and asthma-specific self-efficacy in adults (van der Palen, Klein, & Seydel, 1997). That survey used hypothetical situations to which individuals with asthma could react. The authors were unable to identify self-efficacy as a predictor of adequate self-management skills. They noted that the nature of the hypothetical scenario might not have been very real for their subjects. More studies need to be done to measure self-efficacy before and after real life interventions.

Finally, this study reported on correlates of PCAQ. Unfortunately it was not possible to conduct regression analyses due to the small sample size and number of variables. A future study might examine whether PCAQ is a predictor of asthma outcomes.

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APPENDIX A

Information and Consent Form

CONSENT FORM

THE IMPACT OF ASTHMA EDUCATION ON OUTCOMES: BARRIERS TO OVERCOME

You are being invited to participate in a research project being conducted by J. Olajos-Clow, R.N., E. Costello, Ed.D., and D. Lougheed, M.D. of Kingston General Hospital and Queen's University. The aim of this study is to determine the effects of an asthma education program on quality of life, symptoms and hospitalizations in asthma. The study also aims to determine how to make asthma education programs most effective for patients with different needs.

You will be considered for this study if you have asthma and are over the age of 16 years. This study involves measuring your lung function and personal interviews which will take place during your regular visits to the KGH Asthma Education Centre: one upon enrolment into the study, one after completion of the four education sessions, and one six months later. The interviews will be done in person by an asthma educator. Each interview, which takes approximately 30 minutes, will collect general information (including your age), asthma history (such as how long you have had asthma, usual asthma triggers), other health problems, how often you see your doctor, medication use, and questions about the impact of asthma on your life. You will also be asked to complete a questionnaire about physical and emotional aspects of health and feelings towards asthma management. If for some reason you are unable to come to all of the education sessions, you will be contacted by telephone approximately six months later, and invited to answer questions about why you were unable to come to the sessions and to complete a follow-up questionnaire about physical and emotional aspects of health.

This study ***is not*** evaluating any specific or new drug. Your asthma education will continue in exactly the same manner, whether or not you choose to participate in this study.

As this study involves a personal interview, one possible risk associated with participating in the study is stress placed upon you to answer specific questions. At all times, you may choose not to answer a specific question. If undue stress is experienced, you may withdraw from the study at any time.

While you may not benefit directly from the study, this research may provide a better understanding of factors which determine the effectiveness of asthma education. It is hoped that information from this research will help in the future assessment and management of patients with asthma.

Participation in this study is voluntary. You may refuse to participate or withdraw from the study at any time without affecting your current or future medical care.

All information obtained during this study will be kept confidential. Paper records containing names and addresses will be stored in a locked cabinet and available only to the research assistant, and principal and co-investigators. In computer records of the study

information, you will be identified by your initials and a study number. The identity of the subjects will not be disclosed in any presentation or publication of the study.

You will receive a copy of this consent form for your records.

If you have any questions or concerns during the study, you may contact: Dr. E. Costello, School of Nursing, Queen's University at (613)533-2668; Dr. D. Lougheed, Division of Respiratory and Critical Care Medicine, Queen's University at (613)533-6729; or Dr. P. Munt, Professor and Head, Department of Medicine, Queen's University at (613)533-6327.

By signing this consent form I agree to participate in the above named research project.

Signature of Participant	**Date**
Signature of Witness	**Date**

The information within this consent has been explained to the participant and to the best of my knowledge the subject understands the nature of the study and the risks and benefits involved in the study.

Signature of Investigator	**Date**

APPENDIX B

Asthma Management Questionnaire (Initial)

Adult Initial Visit

Adult Questionnaire – Demographics Screen

Date of Visit:_____

☐ Inpatient ☐ Outpatient Sex: ☐ M ☐ F

Last Name:_____ First Name:_____ Ini:_____

Address: _____ City:_____

Province: _____ Postal Code:_____ Country:_____ Here since:(date) _____

Birth date:_____ Age: _____ Height:(cm) ___ (ft) ___ Weight:(kg) ___ (lbs) ___

Preferred language: _____ In this city/town since: _____

Physician: _____ Interviewer: _____

Hospital #: _____ Insurance #: _____

Telephone # (home) _____ work: _____

Pharmacy Name. _____ Pharmacy Phone: _____

Occupation:

- ☐ Full time employment
- ☐ Part time/seasonal employment
- ☐ Self employed Occupation _____
- ☐ Homemaker (full-time)
- ☐ Student
- ☐ Receive disability/family benefits
  Since: _____
- ☐ Other: _____

Education:

- ☐ Grade 8 or below
- ☐ Some high school
- ☐ High school graduate
- ☐ Technical training
- ☐ Some college or university
- ☐ College or university graduate
- ☐ Post graduate study

Household Income:

- ☐ Less than $ 20 000
- ☐ $20 000 - $ 39 000
- ☐ $40 000 - $ 59 000
- ☐ $60 000 - $ 79 000
- ☐ $80 000 - more

Marital Status

- ☐ Never married
- ☐ Married/Common-law
- ☐ Separated
- ☐ Divorced
- ☐ Widowed

Adult Initial Visit Questionnaire

Patient participating in study:

☐ Yes ☐ No

Study ID# _____

Please name the family doctor and specialist who treat your asthma.

Family physician: _____

Specialist: _____

Referring physician: _____

After collecting demographic information, you can tell your patient, "Please answer the following questions about your asthma/breathing problems. This information will be summarized in the health record and is ***strictly confidential****".*

This questionnaire is divided into eight sections. They are ***History, Contacts with the Health Care System, Symptoms, Triggers, Environment, Coping / Strategies, Medication and Action Plan.***

This section deals with your History

1a. At what age were you told you had asthma? *(Type in "0" [zero] if you are not yet diagnosed. Please round numbers consistently.)*

_____ year(s) of age

_____ month(s) of age

1b. Was this confirmed by a doctor?

☐ Yes ☐ No ☐ Uncertain

2. Please indicate which, if any, of these health problems you have had in the last 12 months.

	Yes	No	Uncertain
Hives	☐	☐	☐
Anaphylaxis	☐	☐	☐
Eczema	☐	☐	☐
Sinusitis	☐	☐	☐
Heartburn (dyspepsia)	☐	☐	☐

3 Please indicate which, if any, of these health problems you have had in the last 12 months. *This is a standardized comorbidity index, based on the Charlson. You can simply ask whether the patient has had other health problems in the last year, such as heart problems. You can then become more specific based on the patient's response.*

	Yes	No	Uncertain
Angina	☐	☐	☐
Myocardial infarction	☐	☐	☐
Congestive heart failure	☐	☐	☐
Arrhythmia	☐	☐	☐
Valvular disease	☐	☐	☐
Peripheral vascular disease	☐	☐	☐

(continued)	Yes	No	Uncertain
Hypertension	☐	☐	☐
Pulmonary disease	☐	☐	☐
Diabetes	☐	☐	☐
Kidney disease	☐	☐	☐
Liver disease	☐	☐	☐
Inflammatory bowel disease	☐	☐	☐
Peptic ulcer disease	☐	☐	☐
Gastrointestinal bleeding	☐	☐	☐
Lymphoma	☐	☐	☐
Leukemia	☐	☐	☐
Cancer	☐	☐	☐
Rheumatologic disease	☐	☐	☐
Other	☐	☐	☐

4. Do any of your immediate family members (brother, sister, mother, father) or grandparents suffer from the following conditions?

	Yes	No
Asthma	☐	☐
Eczema	☐	☐
Hay fever	☐	☐
Reaction to medications, insect bites or food *(Use "Note" to specify)*	☐	☐

Contacts with the Health Care System

5 How many times in the last 12 months have you seen your family doctor for regular or unscheduled treatments of asthma or breathing problems?

_____ regular

_____ _____ unscheduled (urgent visit within 24 hours)

6. How many times in the last 12 months have you gone to your specialist's office for regular or unscheduled treatment of asthma or breathing problems?

   _____ regular

   _____ unscheduled (urgent visit within 24 hours)

7. Have you received asthma education... *You can choose one or both. If "other" is correct, you should ask and specify from whom.*

   ☐ From your doctor?

   ☐ Other? _____

8. In the last 12 months, how many times have you been admitted to hospital for a stay of 24 hours or more for asthma or breathing problems (not counting emergency room visits)? *If admitted for less than 24 hours, please count this as one.*

   _____ times

9. How many days, in total, have you spent in hospital in the last 12 months for asthma or breathing problems? *If admitted for less than 24 hours, please round up to one day.*

   _____ days

10. How many times, in the last 12 months, have you had to visit a hospital emergency room for urgent treatment of asthma or breathing problems? *Visit to ER for asthma requires seeing an ER physician and having paper work filled out for an urgent visit.*

    _____ times

11. How many days of work, school or leisure activities have you had to miss, over the last 12 months, as a result of your asthma or breathing problems?

    _____ work day(s) *(include homemakers here)*

    _____ school day(s)

    _____ leisure day(s)

This section deals with Symptoms

12. During which season are your breathing problems the worst? (you may choose more than one answer, if appropriate.) *If patient's asthma is bad all year long, check off all four seasons. If this is patient's first episode, please answer "no particular season" and indicate first episode in "Note".*

    ☐ Summer
    ☐ Fall
    ☐ Winter
    ☐ Spring
    ☐ No particular season

13. In the past 12 months, how many asthma attacks have you had which resulted in a change in your medication? (ie. Change in maintenance meds)

    _____ attacks

14. Does your asthma bother you always? *This question attempts to address chronicity of condition. You could ask the patient "have you experienced many episodes in the last year?"*

    ☐ Yes ☐ No

15. Over the last 4 weeks, how often have you experienced the following symptoms? *For this type of question, ask the question first and listen to the patient's response. Eg. "over the past four weeks have you experienced the following symptoms; chest tightness?" This way you can narrow down the choice to two or three of the frequencies listed here as options.*

	Daily	Weekly	Monthly	Only with episodes	Not at all
Chest tightness	☐	☐	☐	☐	☐
Coughing	☐	☐	☐	☐	☐
Coughing with phlegm	☐	☐	☐	☐	☐
Night-time awakenings due to asthma (includes early morning symptoms)	☐	☐	☐	☐	☐
Shortness of breath	☐	☐	☐	☐	☐
Wheezing	☐	☐	☐	☐	☐

This section deals with Triggers

16. Have you ever had a skin prick test for allergies? *If IGE/RAST done instead, reply "yes" and use the "note" to indicate IGE/RAST.*

☐ Yes ☐ No

17. Please indicate which tests, if any, have been positive for you *(Choose as many as apply.)*

☐ Cat
☐ Dog
☐ Rodent/bird/other animal
☐ Dust mites/house dust
☐ Mould
☐ Trees/grasses/weeds
☐ Other

18. Which of the following seems to trigger your asthma or make your asthma worse?

	Yes	No	Uncertain
Air pollution	☐	☐	☐
Animals/birds	☐	☐	☐
Aspirin	☐	☐	☐
Certain foods	☐	☐	☐
Cigarette smoke	☐	☐	☐
Cold air	☐	☐	☐
Dusty environment	☐	☐	☐
Exercise	☐	☐	☐
Infections/viruses/colds	☐	☐	☐
Strong emotion (hard laugh)	☐	☐	☐
Strong odours (paint, perfume, etc.)	☐	☐	☐
Weather changes	☐	☐	☐
Pollens/moulds	☐	☐	☐

19. Have you ever smoked for as long as a year? *(yes means at least 20 packs, or 360g (12 oz.) tobacco, or at least one cigarette per day or one cigar a week for one year.)*

☐ Yes ☐ No

Adult Initial Visit Questionnaire

If patient doesn't smoke, go to question # 28

20. How old were you when you started smoking? *(Please leave blank if you have never smoked).*

    _____ years old

21. Do you now smoke, as of one month ago?

    ☐ Yes ☐ No

22. How much do you now smoke on average?

    _____ cigarettes/day

    _____ cigarillos or cigars/day

    _____ pipe tobacco(grams/week)

23. Have you stopped or cut down smoking?

    ☐ Yes ☐ No

24. How old were you when you cut down or quit smoking?

    _____ years old

25. On average of the entire time you smoked, before you stopped or cut down, how much did you smoke? *You can leave this blank if patient has not quit or cut down.*

    _____ cigarettes/day

    _____ cigarillos or cigars/day

    _____ pipe tobacco(grams/week)

26. Do you or did you inhale?

    ☐ Yes ☐ No

27. Have you regularly been exposed to tobacco smoke in the last 12 months? *(Regularly means on most days or nights.)*

    ☐ Yes ☐ No

28. Not counting yourself, how many people in your household smoke regularly?

    _____ people

29. Do people smoke regularly in the room where you work?

    ☐ Yes ☐ No

30. How many hours per day are you exposed to other people's tobacco smoke?

_____ hours

31. Are you exposed to cigarette smoke outside your home on a regular basis?

☐ Yes ☐ No

32. To what extent, if any, does each of the following activities make your asthma or breathing problems worse?

	Not worse at all	Somewhat worse	A lot worse
Vigourous activities	☐	☐	☐
Moderate activities	☐	☐	☐
Lifting/carrying groceries	☐	☐	☐
Climbing several flights of stairs	☐	☐	☐
Climbing one flight of stairs	☐	☐	☐
Bending, kneeling, or stooping	☐	☐	☐
Walking more than one mile	☐	☐	☐
Walking several blocks	☐	☐	☐
Walking one block	☐	☐	☐
Bathing and dressing yourself	☐	☐	☐

33. Are you pregnant? *This question will only appear for female patients. You should also inquire whether a previous pregnancy seemed to make asthma symptoms worse and store this information in the "Note".*

☐ Yes ☐ No ☐ Uncertain

34. Have you had to change your work due to difficulty breathing?

☐ Yes ☐ No ☐ Uncertain

This section deals with your Environment

35a. Which of the following do you have and use in your home? *You can explain the differences between having these in your home and actually using them. You can talk about cleaning filters for heating, cooling.*

	Yes	No
Air conditioner	☐	☐
Dehumidifier (include air-heat exchanger here)	☐	☐
Wall-to-wall carpeting	☐	☐
Gas stove/wood stove	☐	☐
Hygrometer (measure humidity)	☐	☐
Furred pet/bird	☐	☐
Room humidifier/vaporizer	☐	☐
Fire place	☐	☐

35b. Do you live in a basement environment? *Focus on where patient sleeps.*

☐ Yes ☐ No ☐ Uncertain

36. Please indicate which of the following items you have in your bedroom?

	Yes	No
Bed canopy	☐	☐
Wall-to-wall carpeting	☐	☐
Feather pillow/down duvet	☐	☐
Mattress over 10 years old	☐	☐
Open shelving	☐	☐
Furred pet/bird	☐	☐
Plastic (anti-mite) mattress cover	☐	☐
Stuffed toys	☐	☐
Upholstered/stuffed furniture	☐	☐
Venetian blinds	☐	☐
Wool bedding	☐	☐
Polyester pillow/comforter	☐	☐

This section deals with Coping/Strategies

37. Over the last 12 months, to what extent, if any, did your asthma or breathing problems affect you in the following ways? *For this type of question, ask the question first and listen to the patient's response. This way you can narrow down the choice to two or three of the frequencies listed here as options.*

	Never	Rarely	Occasionally	Regularly	Always
Felt anxious, depressed or irritable	☐	☐	☐	☐	☐
Interfered with normal social activities	☐	☐	☐	☐	☐
Caused difficulty in doing daily work	☐	☐	☐	☐	☐

38. How often do you perform the following activities to help control your asthma/breathing problems? *For this type of question, ask the question first and listen to the patient's response. This way you can narrow down the choice to two or three of the frequencies listed here as options. If not applicable (patient does not know what Action Plan is), leave option blank.*

	Never	Rarely	Occasionally	Regularly	Always
Avoid asthma triggers	☐	☐	☐	☐	☐
Carry blue puffer around	☐	☐	☐	☐	☐
Follow Action Plan	☐	☐	☐	☐	☐
Monitor Peak Flow	☐	☐	☐	☐	☐

39. How confident do you feel about managing your asthma/breathing problems?

- ☐ Extremely confident
- ☐ Usually confident
- ☐ Moderately confident
- ☐ Not very confident
- ☐ Not at all confident

Tell us about your Medication

40. List which drugs you are currently taking and in which form. Then write in the dosage of each drug followed by the number of times per day you are taking it. *This item is looking for medications that are specific to asthma. PRN requires you denote this as "1 PRN" if patient provides range of medication doses (eg. 1 or 2 puffs), use the upper limit (ie. 2).*

Drug/form mcg/puff	Dose	Times/day	Times/week	Total/day
1.				
2.				
3.				
4.				
5.				

41. Have you had any of these side effects in the last 12 months?

	Yes	No	Uncertain
Tremors	☐	☐	☐
Sore throat	☐	☐	☐
Thrush	☐	☐	☐
Hoarse voice	☐	☐	☐
Headaches	☐	☐	☐
Increased heart rate	☐	☐	☐

42. Have you had to stop/change any asthma medications in the last 12 months due to any side effects?

☐ Yes ☐ No ☐ Uncertain

43. How many inhalers of your bronchodilator do you use per month?

☐ less than 1 inhaler per month

☐ 1-2 inhalers per month

☐ more than 2 (specify) _____

44. Do you ever NOT buy your asthma medication due to cost or other reason? *If this is patient's first asthma episode, ask "do you ever NOT buy medication in general due to cost or other reason?". A response of "yes" leads to a pop-up screen to type in the reason. Please ask "is the reason cost-related or due to something else?" Then enter either cost or other.*

☐ Yes if Yes, state reason _____

☐ No

☐ Uncertain

This section deals with your Action Plan

45. Has your doctor told you what to do when your asthma gets worse (Action Plan)? You can explain to patient that this is called their Action Plan.

☐ Yes ☐ No

46. Was it written out for you?

☐ Yes ☐ No

47. Do you follow these instructions?

☐ Yes ☐ No

48. Do you feel these instructions help you control your asthma?

☐ Yes ☐ No

49. What do you usually do when you have an attack? *This question probes into self-management behaviour. You can choose only one answer, so have patient decide which is true most of the time. If patient has not had an attack, ask what they would do if they did have one.*

☐ Follow Action Plan

☐ Call family physician

☐ Nothing until you must go to emergency

☐ Take medication as last resort

☐ Go to emergency immediately

☐ Take a bronchodilator.

50. Please enter the quality of life scores for this patient. **This is the 36-item (SF-36) health status measure that the patient completes.**

1. ____	7. ____	13. ____	19. ____	25. ____	31. ____
2. ____	8. ____	14. ____	20. ____	26. ____	32. ____
3. ____	9. ____	15. ____	21. ____	27. ____	33. ____
4. ____	10. ____	16. ____	22. ____	28. ____	34. ____
5. ____	11. ____	17. ____	23. ____	29. ____	35. ____
6. ____	12. ____	18. ____	24. ____	30. ____	36. ____

Adult
Basic Respiratory Physical Assessment

Height (cm) _____ Weight (kg) _____ RR _____ BP _____ HR _____

Sa02 _____ Colour _____ Breathing rhythm _____ Acc. Musc. _____

Comment _____

_____

_____

_____

_____

Testing

Lab _____

_____

Xray _____

_____

Allergy Testing _____

_____

Others _____

_____

Pulmonary Function Testing

Predicted values

Age _____ FVC _____ l ☐ M ☐ F PF _____ l/m

Ht (cm) _____ FEV1 _____ l Race corrected: ☐ yes ☐ no

Wt (kg) _____ FEF* _____ l/s *(25-75%)

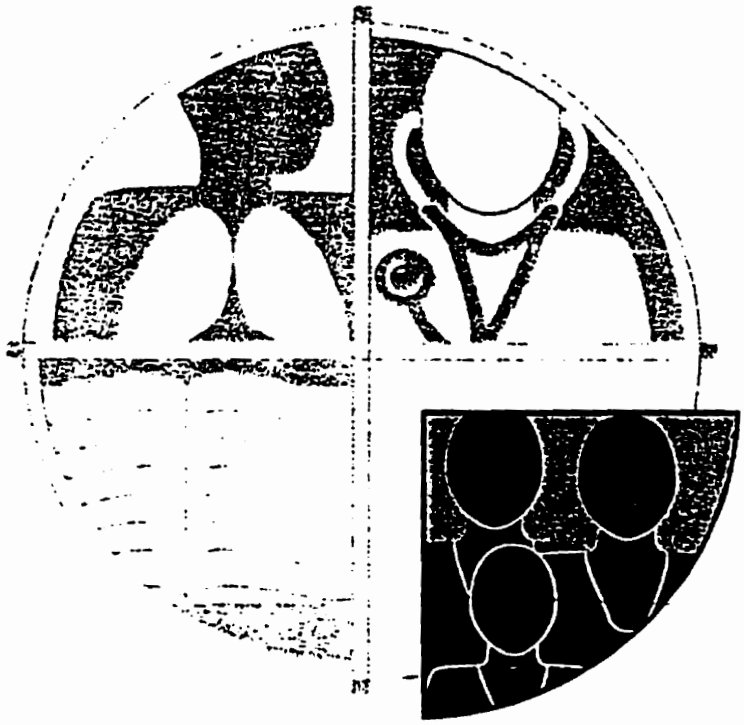
	Pre-dilator				Post-dilator				
	FVC	FEV1*	FEF	PF	FVC	FEV1*	FEF	PF	Best home PF _____
Observ									Swings > ☐ no ☐ yes
% pred									☐ shakes inhaler 10 sec.
Interp									☐ breathe slowly/hold 10 sec.
									☐ wait 1 min between puffs

APPENDIX C

Asthma Management Questionnaire (Follow-up)

Asthma Management Questionnaires

Adult Follow-Up Visit



Developed by Case Mix Research
Department of Community Health and Epidemiology
Queen's University at Kingston

Adult Follow-Up Visit

Adult Questionnaire – Demographics Screen

Date of Visit:_____

☐ Inpatient ☐ Outpatient Sex: ☐ M ☐ F

Last Name:_____ First Name:_____ Ini:____

Address:_____ City:_____

Province:_____ Postal Code:_____ Country:_____ Here since:(date)_____

Birth date:_____ Age:_____ Height:(cm)___ (ft)___ Weight:(kg)___ (lbs)___

Preferred language:_____ In this city/town since:_____ ___

Physician:_____ Interviewer:_____

Hospital #:_____ Insurance #:_____

Telephone # (home)_____ work:_____

Pharmacy Name:_____ Pharmacy Phone:_____

Occupation:

- ☐ Full time employment
- ☐ Part time/seasonal employment
- ☐ Self employed Occupation:_____
- ☐ Homemaker (full-time)
- ☐ Student
- ☐ Receive disability/family benefits

  Since:_____
- ☐ Other:_____

Household Income:

- ☐ Less than $ 20 000
- ☐ $20 000 – $ 39 000
- ☐ $40 000 – $ 59 000
- ☐ $60 000 – $ 79 000
- ☐ $80 000 – more

Adult Follow-Up Visit

Marital Status: (Parent)

- ☐ Never married
- ☐ Married/Common-law
- ☐ Separated
- ☐ Divorced
- ☐ Widowed

Patient participating in study:

☐ Yes ☐ No

Study ID# _____

Please name the family doctor and specialist who treat your asthma.

Family physician: _____

Specialist: _____

Referring physician: _____

After collecting demographic information, you can tell your patient, "Please answer the following questions about your asthma/breathing problems. This information will be summarized in the health record and is ***strictly confidential****".*

This questionnaire is divided into eight sections. They are ***History, Contacts with the Health Care System, Symptoms, Triggers, Environment, Coping / Strategies, Medication and Action Plan.***

This section deals with your History

1. Please indicate which, if any, of these health problems you have had in the last months.

	Yes	No	Uncertain
Hives	☐	☐	☐
Anaphylaxis	☐	☐	☐
Excema	☐	☐	☐
Sinusitis	☐	☐	☐
Heartburn (dyspepsia)	☐	☐	☐

2. Please indicate which, if any, of these health problems you have had in the last months. *This is a standardized comorbidity index, based on the Charlson. You can simply ask whether the patient has had other health problems in the last year, such as heart problems. You can then become more specific based on the patient's response.*

	Yes	No	Uncertain
Angina	☐	☐	☐
Myocardial infarction	☐	☐	☐
Congestive heart failure	☐	☐	☐
Arrhythmia	☐	☐	☐
Valvular disease	☐	☐	☐
Peripheral vascular disease	☐	☐	☐
Hypertension	☐	☐	☐
Pulmonary disease	☐	☐	☐
Diabetes	☐	☐	☐
Kidney disease	☐	☐	☐
Liver disease	☐	☐	☐
Inflammatory bowel disease	☐	☐	☐

(continued)	Yes	No	Uncertain
Peptic ulcer disease	☐	☐	☐
Gastrointestinal bleeding	☐	☐	☐
Lymphoma	☐	☐	☐
Leukemia	☐	☐	☐
Cancer	☐	☐	☐
Rheumatologic disease	☐	☐	☐
Other	☐	☐	☐

Contacts with the Health Care System

3. How many times in the last months have you seen your family doctor for regular or unscheduled treatments of asthma or breathing problems?

   _____ regular

   _____ unscheduled (urgent visit within 24 hours)

4. How many times in the last months have you gone to your specialist's office for regular or unscheduled treatment of asthma or breathing problems?

   _____ regular

   _____ unscheduled (urgent visit within 24 hours)

5. In the last months, have you received asthma education... *You can choose one or both. If "other" is correct, you should ask and specify whom.*

   From your doctor?

   Other? _____

6. In the last months, how many times have you been admitted to hospital for a stay of 24 hours or more for asthma or breathing problems (not counting emergency room visits)? *If admitted for less than 24 hours, please count as one time.*

   _____ times

7. How many days, in total, have you spent in hospital in the last months for asthma or breathing problems? *If admitted for less than 24 hours, please round up to one day.*

   _____ days

8. How many times, in the last months, have you had to visit a hospital emergency room for urgent treatment of asthma or breathing problems? *Visit to ER for asthma requires seeing an ER physician and having paper work filled out for an urgent visit.*

   _____ times

9. How many days of work, school or leisure activities have you had to miss, over the last months, as a result of your asthma or breathing problems?

   _____ work day(s) *(include homemakers here)*

   _____ school day(s)

   _____ leisure day(s)

This section deals with **Symptoms**

10. During which season are your breathing problems the worst? (You may choose more than one answer, if appropriate. *If patient's asthma is bad all year long, check off all four seasons. If this is patient's first episode, please answer "no particular season" and indicate first episode in "Note".*

    - ☐ Summer
    - ☐ Fall
    - ☐ Winter
    - ☐ Spring
    - ☐ No particular season

11. In the past months, how many asthma attacks have you had which resulted in a change in your medication? (ie. Change in maintenance meds)

    _____ number of attacks

12. Does your asthma bother you always? *This question attempts to address chronicity of condition. You could ask the patient "Have you experienced many episodes in the last months?"*

    ☐ Yes ☐ No

13. Over the last 4 weeks, how often have you experienced the following symptoms? *For this type of question, ask the question first and listen to the patient's response. Eg. " Over the past four weeks have you experienced the following symptoms; chest tightness?" This way you can narrow down the choice to two or three of the frequencies listed here as options.*

	Daily	Weekly	Monthly	Only with episodes	Not at all
Chest tightness	❑	❑	❑	❑	❑
Coughing	❑	❑	❑	❑	❑
Coughing with phlegm	❑	❑	❑	❑	❑
Night-time awakenings due to asthma (includes early morning symptoms)	❑	❑	❑	❑	❑
Shortness of breath	❑	❑	❑	❑	❑
Wheezing	❑	❑	❑	❑	❑

This section deals with **Triggers**

14. In the last months, have you had a skin prick test for allergies? *If IGE/RAST done instead, reply "yes" and use the "Note" to indicate IGE/RAST.*

❑ Yes ❑ No

15. Please indicate which tests, if any, have been positive for you *(Choose as many as apply.)*

❑ Cat ❑ Dog

❑ Rodent/bird/other animal ❑ Dust mites/house dust

❑ Mould ❑ Trees/grasses/weeds

❑ Other: _____

16. Which of the following seems to trigger your asthma or make your asthma worse?

	Yes	No	Uncertain
Air pollution	❑	❑	❑
Animals/birds	❑	❑	❑
Aspirin	❑	❑	❑
Certain foods	❑	❑	❑
Cigarette smoke	❑	❑	❑
Cold air	❑	❑	❑
Dusty environment	❑	❑	❑
Exercise	❑	❑	❑
Infections/viruses/colds	❑	❑	❑
Strong emotion (hard laugh)	❑	❑	❑
Strong odours (paint, perfume, etc.)	❑	❑	❑
Weather changes	❑	❑	❑
Pollens/moulds	❑	❑	❑

17. Do you still, or did you start to smoke in the last months? *(Yes means at least 20 packs, or 360g (12 oz. tobacco, or at least one cigarette per day or one cigar a week for one year.)*

❑ Yes ❑ No

18. How much do you now smoke on average?

_____ cigarettes/day

_____ cigarillos or cigars/day

_____ pipe tobacco (grams/week)

19. Have you stopped or cut down smoking?

❑ Yes ❑ No

20. Have you regularly been exposed to tobacco smoke in the last months? *(Regularly means on most days or nights.)*

❑ Yes ❑ No

Adult Follow-Up Visit

21. Not counting yourself, how many people in your household smoke regularly?

_____ people

22. Do people smoke regularly in the room where you work?

❑ Yes ❑ No

23. How many hours per day are you exposed to other people's tobacco smoke?

_____hours

24. Are you exposed to cigarette smoke outside your home on a regular basis?

❑ Yes ❑ No

25. To what extent, if any, does each of the following activities make your asthma or breathing problems worse?

	Not worse at all	Somewhat worse	A lot worse
Vigorous activities	❑	❑	❑
Moderate activities	❑	❑	❑
Lifting/carrying groceries	❑	❑	❑
Climbing several flights of stairs	❑	❑	❑
Climbing one flight of stairs	❑	❑	❑
Bending, kneeling, or stooping	❑	❑	❑
Walking more than one mile	❑	❑	❑
Walking several blocks	❑	❑	❑
Walking one block	❑	❑	❑
Bathing and dressing yourself	❑	❑	❑

26. Are you pregnant? You should also inquire whether a previous pregnancy seemed to make asthma symptoms worse and store this information in the "Note".

❑ Yes ❑ No ❑ Uncertain

27. Have you had to change your work in the last months, due to difficulty breathing?

❑ Yes ❑ No ❑ Uncertain

This section deals with your **Environment**

28a. Which of the following do you have and use in your home? *You can explain the differences between having these in your home and actually using them.*

	Yes	No
Air conditioner	❑	❑
Dehumidifier (include air-heat exchanger here)	❑	❑
Wall-to-wall carpeting	❑	❑
Gas stove/wood stove	❑	❑
Hygrometer (measure humidity)	❑	❑
Furred pet/bird	❑	❑
Room humidifier/vaporizer	❑	❑
Fire place	❑	❑

28b. Do you live in a basement environment? Focus on where patient sleeps.

❑ Yes ❑ No ❑ Uncertain

29. Please indicate which of the following items you have in your bedroom?

	Yes	No
Bed canopy	❑	❑
Wall-to-wall carpeting	❑	❑
Feather pillow/down duvet	❑	❑
Mattress over 10 years old	❑	❑
Open shelving	❑	❑
Furred pet/bird	❑	❑
Plastic (anti-mite mattress cover)	❑	❑
Stuffed toys	❑	❑
Upholstered/stuffed furniture	❑	❑
Venetian blinds	❑	❑
Wool bedding	❑	❑
Polyester pillow/comforter	❑	❑

This section deals with Coping/Strategies

30. Over the last months, to what extent, if any, did your asthma or breathing problems affect you in the following ways? *For this type of question, ask the question first and listen to the patient's response. This way you can narrow down the choice to two or three of the frequencies listed here as options.*

	Never	Rarely	Occasionally	Regularly	Always
Felt anxious, depressed or irritable	❑	❑	❑	❑	❑
Interfered with normal social activities	❑	❑	❑	❑	❑
Caused difficulty in doing daily work	❑	❑	❑	❑	❑

31. How often do you perform the following activities to help control your asthma/breathing problems? *For this type of question, ask the question first and listen to the patient's response. This way you can narrow down the choice to two or three of the frequencies listed here as options. If not applicable (patient does not know what Action Plan is), leave option blank.*

	Never	Rarely	Occasionally	Regularly	Always
Avoid asthma triggers	❑	❑	❑	❑	❑
Carry blue puffer around	❑	❑	❑	❑	❑
Follow Action Plan	❑	❑	❑	❑	❑
Monitor Peak Flow	❑	❑	❑	❑	❑

32. How confident do you feel about managing your asthma/breathing problems?

- ❑ Extremely confident
- ❑ Usually confident
- ❑ Moderately confident
- ❑ Not very confident
- ❑ Not at all confident

Tell us about your **Medication**

33. List which drugs you are currently taking and in which form. Then write in the dosage of each drug followed by the number of times per day you are taking it. *This item is looking for medications that are specific to asthma. PRN requires you denote this as "1 PRN" If patient provides range of medication doses (eg. 1 or 2 puffs), use the upper limit (ie. 2).*

Drug/form mcg/puff	Dose	Times/day	Times/week	Total/day
1.				
2.				
3.				
4.				
5.				

34. Have you had any of these side effects in the last months?

	Yes	No	Uncertain
Tremors	☐	☐	☐
Sore throat	☐	☐	☐
Thrush	☐	☐	☐
Hoarse voice	☐	☐	☐
Headaches	☐	☐	☐
Increased heart rate	☐	☐	☐

35. Have you had to stop/change any asthma medications in the last months due to any side effects?

☐ Yes ☐ No ☐ Uncertain

36. How many inhalers of your bronchodilator do you use per month?

☐ Less than 1 inhaler per month

☐ 1-2 inhalers per month

☐ More than 2 (specify)_____

37. Do you ever NOT buy your asthma medication due to cost or other reason? *If this is patient's first asthma episode, ask "Do you ever NOT buy medication in general due to cost or other reason?". A response of "yes" leads to a pop-up screen to type in the reason. Please ask "Is the reason cost-related or due to something else?" Then enter either cost or other.*

- ❑ Yes If yes, state reason: _____
- ❑ No
- ❑ Uncertain

This section deals with your Action Plan

38. Are you satisfied with your current Action Plan?

❑ Yes ❑ No ❑ Uncertain

39. Do you feel these instructions help you control your asthma?

❑ Yes ❑ No

40. What do you usually do when you have an attack? *This question probes into self-management behaviour. You can choose only one answer, so have patient decide which is true most of the time. If patient has not had an attack, ask what they would do if they did have one.*

- ❑ Follow Action Plan
- ❑ Call family physician
- ❑ Nothing until you must go to emergency
- ❑ Take medication as last resort
- ❑ Go to emergency immediately
- ❑ Take a bronchodilator.

41. Please enter the Quality Of Life scores for this patient. **This is the 36-item (SF-36) health status measure that the patient completes.**

1. ____	7. ____	13. ____	19. ____	25. ____	31. ____
2. ____	8. ____	14. ____	20. ____	26. ____	32. ____
3. ____	9. ____	15. ____	21. ____	27. ____	33. ____
4. ____	10. ____	16. ____	22. ____	28. ____	34. ____
5. ____	11. ____	17. ____	23. ____	29. ____	35. ____
6. ____	12. ____	18. ____	24. ____	30. ____	36. ____

Adult
Basic Respiratory Physical Assessment

Height (cm) _____ Weight (kg) _____ RR _____ BP _____ HR _____

Sa02 _____ Colour _____ Breathing rhythm _____ Acc. Musc. _____

Comment _____

Testing

Lab _____

Xray _____

Allergy Testing _____

Others _____

Pulmonary Function Testing

Predicted values

Age _____ FVC _____ l ❑ M ❑ F PF _____ l/m

Ht (cm) _____ FEV1 _____ l Race corrected: ❑ yes ❑ no

Wt (kg) _____ FEF* _____ l/s *(25-75%)

	Pre-dilator				Post-dilator				
	FVC	FEV1*	FEF	PF	FVC	FEV1*	FEF	PF	Best home PF _____
Observ									Swings > ❑ no ❑ yes
% pred									❑ shakes inhaler 10 sec.
Interp									❑ breathe slowly/hold 10 sec.
									❑ wait 1 min between puffs

APPENDIX D

Perceived Control of Asthma Questionnaire

Perceived Control of Asthma Questionnaire

Patricia P. Katz, Ph.D., Edward H. Yelin, Ph.D., Sherman Smith, B.S , Paul D. Blanc M.D., M.S.P.H.

		Strongly agree (5)	Agree (4)	Don't know/ neutral (3)	Disagree (2)	Strongly disagree (1)
1.	Managing my asthma is largely my own responsibility	SA	A	N	D	SD
2.	I can reduce asthma by staying calm and relaxed	SA	A	N	D	SD
3.	Too often, my asthma just seems to hit me out of the blue.*	SA	A	N	D	SD
4.	If I do all the right things, I can successfully manage my asthma.	SA	A	N	D	SD
5.	I can do a lot of things myself to cope with my asthma.	SA	A	N	D	SD
6.	When I manage my personal life well, my asthma does not affect me as much.	SA	A	N	D	SD
7.	I have considerable ability to control my asthma.	SA	A	N	D	SD
8.	I would feel helpless if I couldn't rely on other people for help when I'm not feeling well from asthma.*	SA	A	N	D	SD
9.	No matter what I do, or how hard I try, I just can't seem to get relief from my asthma.*	SA	A	N	D	SD
10.	I am coping effectively with my asthma.	SA	A	N	D	SD
11.	It seems as though fate and other factors beyond my control affect my asthma.*	SA	A	N	D	SD

* Item reversed for scoring. For scoring information see: Katz P. Yelin E. Smith S, Blanc P: Perceived control of asthma: Development and validation of a questionnaire. *American Journal of Respiratory and Critical Care Medicine* 1997;155:557-582.

APPENDIX E

Measures of Asthma Severity

Canadian Asthma Consensus (1999) Levels of Asthma Severity Based on Treatment Needed to Obtain Control

Asthma Severity	Symptoms	Treatment Required
Very Mild	Mild-infrequent	None, or inhaled short-acting β_2-agonist rarely
Mild	Well-controlled	Short-acting β_2-agonist (occasionally) and low-dose inhaled glucocorticosteroid
Moderate	Well-controlled	Short-acting β_2-agonist and low to moderate doses of inhaled glucocorticosteroid with or without additional therapy
Severe	Well-controlled	Short-acting β_2-agonist and high doses of inhaled glucocorticosteroid and additional therapy
Very Severe	May be controlled or not well-controlled	Short-acting β_2-agonist and high doses of inhaled glucocorticosteroid and additional therapy and oral glucocorticosteroid

NIH (1997) Classification of Asthma Severity

Clinical Features Before Treatment*

	Symptoms**	Nighttime Symptoms	Lung Function
STEP 4 Severe Persistent	▪ Continual symptoms ▪ Limited physical activity ▪ Frequent exacerbations	Frequent	▪ FEV_1 or PEF ≤ 60% predicted ▪ PEF variability >30%
STEP 3 Moderate Persistent	▪ Daily symptoms ▪ Daily use of inhaled short-acting $beta_2$-agonist ▪ Exacerbations affect activity ▪ Exacerbations ≥ 2 times a week; may last days	> 1 time a week	▪ FEV_1 or PEF >60% –<80% predicted ▪ PEF variability >30%
STEP 2 Mild Persistent	▪ Symptoms >2 times a week but < 1 time a day ▪ Exacerbations may affect activity	> 2 times a month	▪ FEV_1 or PEF ≥ 80% predicted ▪ PEF variability 20–30%
STEP 1 Mild Intermittent	▪ Symptoms ≤ 2 times a week ▪ Asymptomatic and normal PEF between exacerbations ▪ Exacerbations brief (from a few hours to a few days), intensity may vary	≤ 2 times a month	▪ FEV_1 or PEF ≥ 80% predicted ▪ PEF variability < 20%

* The presence of one of the features of severity is sufficient to place a patient in that category. An individual should be assigned to the most severe grade in which any feature occurs. The characteristics noted in this figure are general and may overlap because asthma is highly variable. Furthermore, an individual's classification may change over time.

** Patients at any level of severity can have mild, moderate, or severe exacerbations. Some patients with intermittent asthma experience severe and life-threatening exacerbations separated by long periods of normal lung function and no symptoms.

BOX 2. IMPORTANCE OF SPIROMETRY IN ASTHMA DIAGNOSIS

Objective assessments of pulmonary function are necessary for the diagnosis of asthma because medical history and physical examination are not reliable means of excluding other diagnoses or of characterizing the status of lung impairment. Although physicians generally seem able to identify a lung abnormality as obstructive (Russell et al. 1986), they have a poor ability to assess the degree of airflow obstruction (Shim and Williams 1980) or to predict whether the obstruction is reversible (Russell et al. 1986).

For diagnostic purposes, spirometry is generally recommended over measurements by a peak flow meter in the clinician's office because there is wide variability even in the best published peak expiratory flow reference values. Reference values need to be specific to each brand of peak flow meter, and such normative brand-specific values currently are not available for most brands. Peak flow meters are designed as monitoring, not as diagnostic, tools in the office (see component 1-Periodic Assessment and Monitoring). However, peak flow monitoring can establish peak flow variability and thus aid in the determination of asthma severity when patients have asthma symptoms and normal spirometry (see Additional Studies section, page 19).

NIH (1995) GINA Classification of Asthma Severity

Establish Diagnosis

Ask patient or parents: Does the patient have

- Recurrent attacks of wheezing?
- Troublesome cough or wheeze at night or early in the morning?
- Cough or wheeze after exercise?
- Cough, wheeze, or chest tightness after exposure to airborne allergens or pollutants?
- Colds that "go to the chest" or take more than 10 days to clear up?
- Antiasthma medicine? How frequently does the patient take it?

Measure lung function with spirometry or peak flow meter, if available.

	Classify Severity of Asthma	
	Clinical Features Before Treatment	**Medication Required To**
STEP 4 Severe Persistent	Continuous symptoms Frequent exacerbations Frequent nighttime asthma symptoms Physical activities limited by asthma symptoms PEF or FEV_1 • ≤60 % predicted. • variability >30%	Multiple daily long-term preventive medications high doses inhaled corticosteroid, long-acting bronchodilator, and oral corticosteroid long term
STEP 3 Moderate Persistent	Symptoms daily Exacerbations affect activity and sleep Nighttime asthma symptoms >1 time a week Daily use of inhaled short-acting β_2-agonist PEF or FEV_1 • >60% - <80% predicted. • variability >30%	Daily long-term preventive medications inhaled corticosteroid and long-acting bronchodilator (especially for nighttime symptoms)
STEP 2 Mild Persistent	Symptoms ≥1 time a week but <1 time per day Exacerbations may affect activity and sleep Nighttime asthma symptoms >2 times a month PEF or FEV_1 • ≥80% predicted. • variability 20 -30%	One daily long-term preventive medication possibly add a long-acting bronchodilator to anti inflammatory medication (especially for nighttime symptoms)
STEP 1 Intermittent	Intermittent symptoms <1 time a week Brief exacerbations (from a few hours to a few days) Nighttime asthma symptoms ≤2 times a month Asymptomatic and normal lung function between exacerbations PEF or FEV_1 • ≥80% predicted • variability <20%	• Intermittent quick-relief medication taken as needed only inhaled short-acting β_2-agonist • Intensity of treatment depends on severity of exacerbation oral corticosteroids may be required

The presence of one of the features of severity is sufficient to place a patient in that category

APPENDIX F

Outline of "Breathe Easier: An Adult Asthma Education Program"

BREATHE EASIER: AN ADULT ASTHMA EDUCATION PROGRAM

Developed by the American Institutes for Research and the Kaiser-Permanente Medical Group

National Heart, Lung, and Blood Institute
National Institutes of Health

National Asthma Education and Prevention Program

SESSION 1:
INTRODUCTION TO ASTHMA

MATERIALS FOR SESSION 1:

- Name tags
- Handouts 1-5 (fill in Handout 1 before the session starts)
- Folders for handouts (put handouts in folder before the session starts)
- Peak flow meters

SESSION 2:
UNDERSTANDING YOUR MEDICATIONS

MATERIALS FOR SESSION 2:

- Handouts 6-15
- Extra copies of Handout 2
- Placebo metered-dose inhalers
- Spacers

Session 3:
Prevention and Avoidance:
Fitting Asthma Into Your Life

Materials for Session 3:

- Handouts 16-23
- Write your name on top of each copy of Handout 19.
- Role-playing exercise scripts
- List of local exercise and stress management resources

Session 4:
Managing Your Symptoms: How To Handle Asthma Episodes/Attacks

Materials for Session 4:

- Handouts 24-28
- Additional copies of Handout 19
- Copy of Handout 5
- Information on local smoking cessation programs

APPENDIX G

Thesis Data

Table G1

Chi-square analysis to Compare Baseline Demographic Characteristics between the Study Group and Remaining Eligible Sample

Characteristic	Value	df	Significance
Gender	.133	1	.716
Age Group	9.091	3	.028
Education	16.749	6	.010
Income Level	4.460	4	.347
Marital Status	5.484	4	.241
Occupation	17.693	6	.007

Table G2

Independent Samples t-test to Compare Baseline Perceived Control of Asthma (PCAQ), Peak Expiratory Flow Rate (PEFR) and Health Care Utilization between the Study Group and Remaining Eligible Sample

Characteristic	t	df	Significance (2-tailed)
PCAQ	-1.2	92	.233
PEFR (L/min)	1.287	94	.201
PEFR (% Predicted)	1.040	94	.301
Regular Doctor Visits	-1.66	127	.103
Unscheduled Doctor Visits	.878	127	.382
Regular Specialist Visits	-.302	129	.763
Unscheduled Specialist Visits	-1.343	130	.182
Hospital Admissions	-.069	129	.945
Emergency Visits	2.712	129	.008

Table G3:

Independent Samples t-test to Compare Baseline Domain Scores of the SF-36 between the Study Group and Remaining Eligible Sample

Domain	t	df	Significance (2-tailed)
Physical Functioning	-.134	114	.893
Role Physical	1.052	115	.295
Bodily Pain	1.188	115	.237
General Health	-.852	132	.396
Vitality	-.747	115	.456
Social Functioning	-.997	115	.321
Role Emotional	1.026	114	.307
Mental Health	-.046	115	.964

Table G4

Independent Samples t-test to Compare Baseline Domain Scores of the AQLQ between the Study Group and Remaining Eligible Sample

Domain	t	df	Significance (2-tailed)
Symptoms	-.851	93	.397
Activity Limitations	-.964	93	.338
Emotional Functioning	-2.132	93	.036
Environmental Stimuli	-1.363	93	.176
Total Score	-1.365	93	.176

Table G5

Tests of Within-Subjects Effects for the Physical Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	2188.814	1.832	1194.741	7.404	.002
Error (TIME)	9459.964	58.625	161.363		

Table G6

Tests of Within-Subjects Contrasts for the Physical Functioning Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	2187.879	1	2187.879	11.362	.002
	Quadratic	.936	1	.936	.009	.925
Error (TIME)	Linear	6162.121	32	192.566		
	Quadratic	3297.843	32	103.058		

Table G7

Tests of Within-Subjects Effects for the Physical Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	1597.517	1.829	873.557	4.979	.012
TIME * MARITGP	1.859	1.829	1.016	.006	.991
TIME * SEX	50.218	1.829	27.460	.157	.837
TIME * MARITGP * SEX	65.148	1.829	35.624	.203	.798
Error (TIME)	9304.804	53.034	175.451		

Table G8

Tests of Within-Subjects Contrasts for the Physical Functioning Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	1574.248	1	1574.248	7.515	.010
	Quadratic	23.269	1	23.269	.209	.651
TIME * MARITGP	Linear	1.851	1	1.851	.009	.926
	Quadratic	7.258E-03	1	7.258E-03	.000	.994
TIME * SEX	Linear	2.962E-03	1	2.962E-03	.000	.997
	Quadratic	50.215	1	50.215	.451	.507
TIME * MARITGP * SEX	Linear	49.294	1	49.294	.235	.631
	Quadratic	15.854	1	15.854	.142	.709
Error (TIME)	Linear	6075.321	29	209.494		
	Quadratic	3229.483	29	111.361		

Table G9

Tests of Between-Subjects Effects for the Physical Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	336504.165	1	336504.165	184.493	.000
MARITGP	6510.909	1	6510.909	3.570	.069
SEX	3005.432	1	3005.432	1.648	.209
MARITGP * SEX	940.877	1	940.877	.516	.478
Error	52894.371	29	1823.944		

Table G10

Tests of Within-Subjects Effects for the Physical Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	921.561	1.802	511.511	2.911	.070
TIME • AGEGP	394.370	5.405	72.965	.415	.849
TIME • SEX	109.246	1.802	60.637	.345	.688
TIME • AGEGP • SEX	959.865	5.405	177.591	1.011	.426
Error (TIME)	7914.911	45.041	175.726		

Table G11

Tests of Within-Subjects Contrasts for the Physical Functioning Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	918.259	1	918.259	4.361	.047
	Quadratic	3.301	1	3.301	.031	.861
TIME • AGEGP	Linear	56.149	3	18.716	.089	.965
	Quadratic	338.222	3	112.741	1.063	.382
TIME • SEX	Linear	42.874	1	42.874	.204	.656
	Quadratic	66.372	1	66.372	.626	.436
TIME • AGEGP • SEX	Linear	769.933	3	256.644	1.219	.323
	Quadratic	189.932	3	63.311	.597	.623
Error (TIME)	Linear	5263.542	25	210.542		
	Quadratic	2651.370	25	106.055		

Table G12

Tests of Between-Subjects Effects for the Physical Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	279828.048	1	279828.048	111.571	.000
AGEGP	2989.945	3	996.648	.397	.756
SEX	2531.893	1	2531.893	1.009	.325
AGEGP * SEX	325.936	3	108.645	.043	.988
Error	62701.740	25	2508.070		

Table G13

Tests of Within-Subjects Effects for the Role Physical Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	13174.020	1.973	6677.257	5.882	.005
Error (TIME)	73909.314	65.108	1135.181		

Table G14

Tests of Within-Subjects Contrasts for the Role Physical Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	11259.191	1	11259.191	11.327	.002
	Quadratic	1914.828	1	1914.828	1.537	.224
Error (TIME)	Linear	32803.309	33	994.040		
	Quadratic	41106.005	33	1245.637		

Table G15

Tests of Within-Subjects Effects for the Role Physical Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	11426.091	1.954	5847.556	5.006	.010
TIME * MARITGP	13.921	1.954	7.124	.006	.993
TIME * SEX	362.658	1.954	185.598	.159	.849
TIME * MARITGP * SEX	3801.234	1.954	1945.366	1.666	.198
Error (TIME)	68467.949	58.62	1168.000		

Table G16

Tests of Within-Subjects Contrasts for the Role Physical Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	10144.482	1	10144.482	10.460	.003
	Quadratic	1281.609	1	1281.609	.977	.331
TIME * MARITGP	Linear	.969	1	.969	.001	.975
	Quadratic	12.952	1	12.952	.010	.922
TIME * SEX	Linear	349.706	1	349.706	.361	.553
	Quadratic	12.952	1	12.952	.010	.922
TIME * MARITGP * SEX	Linear	2519.625	1	2519.625	2.598	.117
	Quadratic	1281.609	1	1281.609	.977	.331
Error (TIME)	Linear	29096.154	30	969.872		
	Quadratic	39371.795	30	1312.393		

Table G17

Tests of Between-Subjects Effects for the Role Physical Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	176647.603	1	176647.603	71.490	.000
MARITGP	6415.112	1	6415.112	2.596	.118
SEX	7767.006	1	7767.006	3.143	.086
MARITGP * SEX	109.142	1	109.142	.044	.835
Error	74128.205	30	2470.940		

Table G18

Tests of Within-Subjects Effects for the Role Physical Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	6317.296	1.947	3244.621	2.616	.084
TIME * AGEGP	670.089	5.841	114.721	.092	.996
TIME * SEX	1189.907	1.947	611.147	.493	.609
TIME * AGEGP * SEX	8847.173	5.841	1514.663	1.221	.312
Error (TIME)	62797.619	50.62	1240.517		

Table G19

Tests of Within-Subjects Contrasts for the Role Physical Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	5805.467	1	5805.467	5.694	.025
	Quadratic	511.829	1	511.829	.367	.550
TIME * AGEGP	Linear	527.083	3	175.694	.172	.914
	Quadratic	143.006	3	47.669	.034	.991
TIME * SEX	Linear	113.787	1	113.787	.112	.741
	Quadratic	1076.120	1	1076.120	.771	.388
TIME * AGEGP * SEX	Linear	5655.208	3	1885.069	1.849	.163
	Quadratic	3191.964	3	1063.988	.762	.525
Error (TIME)	Linear	26510.417	26	1019.631		
	Quadratic	36287.202	26	1395.662		

Table G20

Tests of Between-Subjects Effects for the Role Physical Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	139132.237	1	139132.237	54.670	.000
AGEGP	13288.616	3	4429.539	1.741	.183
SEX	4060.581	1	4060.581	1.596	.218
AGEGP * SEX	5026.116	3	1675.372	.658	.585
Error	66168.155	26	2544.929		

Table G21

Tests of Within-Subjects Effects for the Bodily Pain Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	5410.294	1.776	3045.822	8.671	.001
Error (TIME)	20590.373	58.62	351.264		

Table G22

Tests of Within-Subjects Contrasts for the Bodily Pain Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	5382.721	1	5382.721	13.817	.001
	Quadratic	27.574	1	27.574	.118	.734
Error (TIME)	Linear	12855.779	33	389.569		
	Quadratic	7734.593	33	234.382		

Table G23

Tests of Within-Subjects Effects for the Bodily Pain Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	4425.519	1.713	2584.086	7.601	.002
TIME * MARITGP	370.146	1.713	216.130	.636	.510
TIME * SEX	88.803	1.713	51.852	.153	.827
TIME * MARITGP * SEX	1774.564	1.713	1036.178	3.048	.064
Error (TIME)	17467.477	51.38	339.979		

Table G24

Tests of Within-Subjects Contrasts for the Bodily Pain Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	4323.210	1	4323.210	12.650	.001
	Quadratic	102.309	1	102.309	.425	.519
TIME * MARITGP	Linear	108.480	1	108.480	.317	.577
	Quadratic	261.666	1	261.666	1.088	.305
TIME * SEX	Linear	44.852	1	44.852	.131	.720
	Quadratic	43.951	1	43.951	.183	.672
TIME * MARITGP * SEX	Linear	1280.062	1	1280.062	3.746	.062
	Quadratic	494.502	1	494.502	2.056	.162
Error (TIME)	Linear	10252.733	30	341.758		
	Quadratic	7214.744	30	240.491		

Table G25

Tests of Between-Subjects Effects for the Bodily Pain Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	256007.215	1	256007.215	122.594	.000
MARITGP	2045.562	1	2045.562	.980	.330
SEX	66.140	1	66.140	.032	.860
MARITGP * SEX	695.353	1	695.353	.333	.568
Error	62647.426	30	2088.248		

Table G26

Tests of Within-Subjects Effects for the Bodily Pain Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	4756.329	1.812	2624.689	6.957	.003
TIME * AGEGP	651.238	5.436	119.791	.318	.912
TIME * SEX	64.698	1.812	35.702	.095	.893
TIME * AGEGP * SEX	1790.875	5.436	329.420	.873	.513
Error (TIME)	17775.556	47.12	377.273		

Table G27

Tests of Within-Subjects Contrasts for the Bodily Pain Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	4738.325	1	4738.325	11.141	.003
	Quadratic	18.005	1	18.005	.070	.794
TIME * AGEGP	Linear	557.421	3	185.807	.437	.728
	Quadratic	93.817	3	31.272	.121	.947
TIME * SEX	Linear	20.189	1	20.189	.047	.829
	Quadratic	44.508	1	44.508	.172	.681
TIME * AGEGP * SEX	Linear	1605.228	3	535.076	1.258	.309
	Quadratic	185.647	3	61.882	.240	.868
Error (TIME)	Linear	11058.429	26	425.324		
	Quadratic	6717.127	26	258.351		

Table G28

Tests of Between-Subjects Effects for the Bodily Pain Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	200926.856	1	200926.856	85.449	.000
AGEGP	3030.167	3	1010.056	.430	.734
SEX	231.179	1	231.179	.098	.756
AGEGP * SEX	38.593	3	12.864	.005	.999
Error	61136.694	26	2351.411		

Table G29

Tests of Within-Subjects Effects for the General Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	1779.666	1.350	1318.563	2.130	.145
Error (TIME)	28407.742	45.89	619.042		

Table G30

Tests of Within-Subjects Contrasts for the General Health Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	1723.435	1	1723.435	2.870	.099
	Quadratic	56.231	1	56.231	.239	.628
Error (TIME)	Linear	20414.121	34	600.415		
	Quadratic	7993.621	34	235.107		

Table G31

Tests of Within-Subjects Effects for the General Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	3156.357	1.373	2298.614	3.854	.044
TIME * MARITGP	157.863	1.373	114.964	.193	.741
TIME * SEX	1047.668	1.373	762.963	1.279	.278
TIME * MARITGP * SEX	1964.471	1.373	1430.624	2.399	.119
Error (TIME)	25390.162	42.57	596.463		

Table G32

Tests of Within-Subjects Contrasts for the General Health Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	3015.852	1	3015.852	5.321	.028
	Quadratic	140.505	1	140.505	.557	.461
TIME*MARITGP	Linear	83.769	1	83.769	.148	.703
	Quadratic	74.094	1	74.094	.294	.592
TIME*SEX	Linear	979.529	1	979.529	1.728	.198
	Quadratic	68.139	1	68.139	.270	.607
TIME*MARITGP* SEX	Linear	1832.214	1	1832.214	3.233	.082
	Quadratic	132.257	1	132.257	.524	.474
Error (TIME)	Linear	17570.669	31	566.796		
	Quadratic	7819.493	31	252.242		

Table G33

Tests of Between-Subjects Effects for the General Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	262423.540	1	262423.540	466.950	.000
MARITGP	2045.241	1	2045.241	3.639	.066
SEX	944.752	1	944.752	1.681	.204
MARITGP * SEX	57.105	1	57.105	.102	.752
Error	17421.831	31	561.995		

Table G34

Tests of Within-Subjects Effects for the General Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	1580.032	1.378	1146.424	1.738	.196
TIME * AGEGP	798.552	4.135	193.135	.293	.886
TIME * SEX	612.235	1.378	444.219	.673	.463
TIME * AGEGP * SEX	2072.237	4.135	501.184	.760	.562
Error (TIME)	24549.426	37.21	659.716		

Table G35

Tests of Within-Subjects Contrasts for the General Health Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	1576.929	1	1576.929	2.454	.129
	Quadratic	3.103	1	3.103	.012	.915
TIME * AGEGP	Linear	747.365	3	249.122	.388	.763
	Quadratic	51.187	3	17.062	.064	.978
TIME * SEX	Linear	607.422	1	607.422	.945	.340
	Quadratic	4.812	1	4.812	.018	.894
TIME * AGEGP * SEX	Linear	1527.760	3	509.253	.792	.509
	Quadratic	544.477	3	181.492	.681	.571
Error (TIME)	Linear	17351.915	27	642.664		
	Quadratic	7197.511	27	266.574		

Table G36

Tests of Between-Subjects Effects for the General Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	182013.603	1	182013.603	276.865	.000
AGEGP	612.386	3	204.129	.311	.818
SEX	1049.164	1	1049.164	1.596	.217
AGEGP * SEX	1277.422	3	425.807	.648	.591
Error	17750.034	27	657.409		

Table G37

Tests of Within-Subjects Effects for the Vitality Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	3736.083	1.667	2241.530	9.763	.001
Error (TIME)	12245.398	53.34	229.589		

Table G38

Tests of Within-Subjects Contrasts for the Vitality Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	3712.500	1	3712.500	21.172	.000
	Quadratic	23.583	1	23.583	.114	.738
Error (TIME)	Linear	5611.111	32	175.347		
	Quadratic	6634.287	32	207.321		

Table G39

Tests of Within-Subjects Effects for the Vitality Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	3089.988	1.616	1911.805	7.941	.002
TIME • MARITGP	79.452	1.616	49.158	.204	.769
TIME • SEX	41.867	1.616	25.904	.108	.857
TIME • MARITGP • SEX	418.310	1.616	258.812	1.075	.337
Error (TIME)	11284.907	46.87	240.761		

Table G40

Tests of Within-Subjects Contrasts for the Vitality Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	3057.173	1	3057.173	18.861	.000
	Quadratic	32.815	1	32.815	.145	.707
TIME * MARITGP	Linear	54.709	1	54.709	.338	.566
	Quadratic	24.743	1	24.743	.109	.744
TIME * SEX	Linear	27.814	1	27.814	.172	.682
	Quadratic	14.053	1	14.053	.062	.805
TIME *MARITGP* SEX	Linear	416.785	1	416.785	2.571	.120
	Quadratic	1.525	1	1.525	.007	.935
Error (TIME)	Linear	4700.518	29	162.087		
	Quadratic	6584.389	29	227.048		

Table G41

Tests of Between-Subjects Effects for the Vitality Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	175018.719	1	175018.719	152.377	.000
MARITGP	4129.748	1	4129.748	3.596	.068
SEX	305.164	1	305.164	.266	.610
MARITGP * SEX	3.336	1	3.336	.003	.957
Error	33309.035	29	1148.587		

Table G42

Tests of Within-Subjects Effects for the Vitality Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	1626.395	1.633	996.225	3.488	.049
TIME * AGEGP	147.351	4.898	30.086	.105	.990
TIME * SEX	59.752	1.633	36.600	.128	.839
TIME * AGEGP * SEX	462.543	4.898	94.441	.331	.888
Error (TIME)	11657.882	40.81	285.635		

Table G43

Tests of Within-Subjects Contrasts for the Vitality Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	1575.233	1	1575.233	7.469	.011
	Quadratic	51.162	1	51.162	.200	.658
TIME * AGEGP	Linear	135.648	3	45.216	.214	.885
	Quadratic	11.703	3	3.901	.015	.997
TIME * SEX	Linear	1.731	1	1.731	.008	.929
	Quadratic	58.021	1	58.021	.227	.638
TIME * AGEGP * SEX	Linear	284.777	3	94.926	.450	.719
	Quadratic	177.766	3	59.255	.232	.873
Error (TIME)	Linear	5272.231	25	210.889		
	Quadratic	6385.651	25	255.426		

Table G44

Tests of Between-Subjects Effects for the Vitality Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	121837.163	1	121837.163	87.725	.000
AGEGP	2198.062	3	732.687	.528	.667
SEX	573.369	1	573.369	.413	.526
AGEGP * SEX	3102.321	3	1034.107	.745	.536
Error	34721.195	25	1388.848		

Table G45

Tests of Within-Subjects Effects for the Social Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	2659.314	1.958	1358.401	2.404	.100
Error (TIME)	36507.353	64.60	565.099		

Table G46

Tests of Within-Subjects Contrasts for the Social Functioning Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	2656.250	1	2656.250	5.610	.024
	Quadratic	3.064	1	3.064	.005	.945
Error (TIME)	Linear	15625.000	33	473.485		
	Quadratic	20882.353	33	632.799		

Table G47

Tests of Within-Subjects Effects for the Social Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	1543.070	1.901	811.598	1.415	.251
TIME * MARITGP	1290.008	1.901	678.497	1.183	.312
TIME * SEX	1145.060	1.901	602.259	1.050	.354
TIME * MARITGP * SEX	201.700	1.901	106.087	.185	.821
Error (TIME)	32716.880	57.04	573.596		

Table G48

Tests of Within-Subjects Contrasts for the Social Functioning Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	1186.675	1	1186.675	2.773	.106
	Quadratic	356.395	1	356.395	.538	.469
TIME * MARITGP	Linear	1186.675	1	1186.675	2.773	.106
	Quadratic	103.333	1	103.333	.156	.696
TIME * SEX	Linear	172.216	1	172.216	.402	.531
	Quadratic	972.844	1	972.844	1.468	.235
TIME * MARITGP * SEX	Linear	172.216	1	172.216	.402	.531
	Quadratic	29.484	1	29.484	.044	.834
Error (TIME)	Linear	12836.538	30	427.885		
	Quadratic	19880.342	30	662.678		

Table G49

Tests of Between-Subjects Effects for the Social Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	355665.909	1	355665.909	289.410	.000
MARITGP	643.067	1	643.067	.523	.475
SEX	3675.859	1	3675.859	2.991	.094
MARITGP * SEX	1731.375	1	1731.375	1.409	.245
Error	36868.056	30	1228.935		

Table G50

Tests of Within-Subjects Effects for the Social Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	882.447	1.978	446.202	.738	.482
TIME * AGEGP	1654.154	5.933	278.803	.461	.832
TIME * SEX	517.532	1.978	261.686	.433	.649
TIME * AGEGP * SEX	3166.133	5.933	533.643	.882	.514
Error (TIME)	31098.710	51.420	604.800		

Table G51

Tests of Within-Subjects Contrasts for the Social Functioning Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	832.018	1	832.018	1.546	.225
	Quadratic	50.429	1	50.429	.077	.784
TIME * AGEGP	Linear	417.569	3	139.190	.259	.854
	Quadratic	1236.585	3	412.195	.626	.604
TIME * SEX	Linear	388.149	1	388.149	.721	.403
	Quadratic	129.383	1	129.383	.197	.661
TIME * AGEGP * SEX	Linear	1401.944	3	467.315	.869	.470
	Quadratic	1764.190	3	588.063	.894	.458
Error (TIME)	Linear	13988.095	26	538.004		
	Quadratic	17110.615	26	658.101		

Table G52

Tests of Between-Subjects Effects for the Social Functioning Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	243252.627	1	243252.627	166.701	.000
AGEGP	1853.751	3	617.917	.423	.738
SEX	2131.675	1	2131.675	1.461	.238
AGEGP * SEX	2950.626	3	983.542	.674	.576
Error	37939.608	26	1459.216		

Table G53

Tests of Within-Subjects Effects for the Role Emotional Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	22244.009	1.994	11155.612	8.619	.000
Error (TIME)	85163.399	65.801	1294.254		

Table G54

Tests of Within-Subjects Contrasts for the Role Emotional Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	21176.471	1	21176.471	16.577	.000
	Quadratic	1067.538	1	1067.538	.819	.372
Error (TIME)	Linear	42156.863	33	1277.481		
	Quadratic	43006.536	33	1303.228		

Table G55

Tests of Within-Subjects Effects for the Role Emotional Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	20084.450	1.998	10050.602	7.418	.001
TIME * MARITGP	2737.849	1.998	1370.067	1.011	.370
TIME * SEX	1543.819	1.998	772.554	.570	.568
TIME * MARITGP * SEX	1576.987	1.998	789.151	.582	.562
Error (TIME)	81230.769	59.950	1354.976		

Table G56

Tests of Within-Subjects Contrasts for the Role Emotional Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	17683.888	1	17683.888	13.297	.001
	Quadratic	2400.561	1	2400.561	1.742	.197
TIME * MARITGP	Linear	2150.019	1	2150.019	1.617	.213
	Quadratic	587.830	1	587.830	.427	.519
TIME * SEX	Linear	221.202	1	221.202	.166	.686
	Quadratic	1322.618	1	1322.618	.960	.335
TIME * MARITGP * SEX	Linear	1105.243	1	1105.243	.831	.369
	Quadratic	471.744	1	471.744	.342	.563
Error (TIME)	Linear	39897.436	30	1329.915		
	Quadratic	41333.333	30	1377.778		

Table G57

Tests of Between-Subjects Effects for the Role Emotional Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	282452.354	1	282452.354	142.280	.000
MARITGP	4041.842	1	4041.842	2.036	.164
SEX	1225.156	1	1225.156	.617	.438
MARITGP * SEX	1487.945	1	1487.945	.750	.393
Error	59555.556	30	1985.185		

Table G58

Tests of Within-Subjects Effects for the Role Emotional Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	10662.246	1.963	5430.779	4.136	.022
TIME * AGEGP	7376.279	5.890	1252.361	.954	.465
TIME * SEX	519.524	1.963	264.618	.202	.814
TIME * AGEGP * SEX	8697.266	5.890	1476.641	1.125	.361
Error (TIME)	67019.400	51.046	1312.927		

Table G59

Tests of Within-Subjects Contrasts for the Role Emotional Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	7557.396	1	7557.396	6.001	.021
	Quadratic	3104.850	1	3104.850	2.355	.137
TIME * AGEGP	Linear	1327.513	3	442.504	.351	.788
	Quadratic	6048.765	3	2016.255	1.529	.230
TIME * SEX	Linear	519.180	1	519.180	.412	.526
	Quadratic	.344	1	.344	.000	.987
TIME * AGEGP * SEX	Linear	7949.735	3	2649.912	2.104	.124
	Quadratic	747.531	3	249.177	.189	.903
Error (TIME)	Linear	32744.709	26	1259.412		
	Quadratic	34274.691	26	1318.257		

Table G60

Tests of Between-Subjects Effects for the Role Emotional Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	218313.632	1	218313.632	98.685	.000
AGEGP	4425.573	3	1475.191	.667	.580
SEX	4263.149	1	4263.149	1.927	.177
AGEGP * SEX	137.919	3	45.973	.021	.996
Error	57517.637	26	2212.217		

Table G61

Tests of Within-Subjects Effects for the Mental Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	819.152	1.684	486.344	2.275	.121
Error (TIME)	11522.182	53.898	213.779		

Table G62

Tests of Within-Subjects Contrasts for the Mental Health Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	655.515	1	655.515	3.288	.079
	Quadratic	163.636	1	163.636	1.018	.320
Error (TIME)	Linear	6380.485	32	199.390		
	Quadratic	5141.697	32	160.678		

Table G63

Tests of Within-Subjects Effects for the Mental Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	1447.441	1.691	855.988	3.920	.033
TIME * MARITGP	202.336	1.691	119.658	.548	.553
TIME * SEX	600.207	1.691	354.951	1.625	.210
TIME * MARITGP * SEX	241.861	1.691	143.032	.655	.499
Error (TIME)	10709.084	49.038	218.384		

Table G64

Tests of Within-Subjects Contrasts for the Mental Health Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	1248.308	1	1248.308	6.353	.017
	Quadratic	199.133	1	199.133	1.153	.292
TIME * MARITGP	Linear	202.161	1	202.161	1.029	.319
	Quadratic	.175	1	.175	.001	.975
TIME * SEX	Linear	575.470	1	575.470	2.929	.098
	Quadratic	24.737	1	24.737	.143	.708
TIME * MARITGP * SEX	Linear	156.212	1	156.212	.795	.380
	Quadratic	85.650	1	85.650	.496	.487
Error (TIME)	Linear	5698.613	29	196.504		
	Quadratic	5010.471	29	172.775		

Table G65

Tests of Between-Subjects Effects for the Mental Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	310553.059	1	310553.059	412.433	.000
MARITGP	2341.977	1	2341.977	3.110	.088
SEX	305.009	1	305.009	.405	.529
MARITGP * SEX	115.844	1	115.844	.154	.698
Error	21836.368	29	752.978		

Table G66

Tests of Within-Subjects Effects for the Mental Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	690.246	1.689	408.644	1.902	.167
TIME * AGEGP	754.433	5.067	148.882	.693	.633
TIME * SEX	131.808	1.689	78.034	.363	.662
TIME * AGEGP * SEX	1328.088	5.067	262.088	1.220	.316
Error (TIME)	9071.658	42.228	214.827		

Table G67

Tests of Within-Subjects Contrasts for the Mental Health Domain of the SF-36

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	437.071	1	437.071	2.297	.142
	Quadratic	253.175	1	253.175	1.467	.237
TIME * AGEGP	Linear	420.149	3	140.050	.736	.540
	Quadratic	334.284	3	111.428	.646	.593
TIME * SEX	Linear	82.112	1	82.112	.432	.517
	Quadratic	49.696	1	49.696	.288	.596
TIME * AGEGP * SEX	Linear	1073.056	3	357.685	1.880	.159
	Quadratic	255.033	3	85.011	.493	.691
Error (TIME)	Linear	4757.282	25	190.291		
	Quadratic	4314.376	25	172.575		

Table G68

Tests of Between-Subjects Effects for the Mental Health Domain of the SF-36

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	214594.136	1	214594.136	259.533	.000
AGEGP	1876.750	3	625.583	.757	.529
SEX	145.588	1	145.588	.176	.678
AGEGP * SEX	1896.396	3	632.132	.765	.525
Error	20671.214	25	826.849		

Table G69

Tests of Within-Subjects Effects for the Symptom Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	35.442	1.507	23.522	11.747	.000
Error (TIME)	96.548	48.216	2.002		

Table G70

Tests of Within-Subjects Contrasts for the Symptom Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	33.147	1	33.147	17.366	.000
	Quadratic	2.295	1	2.295	2.071	.160
Error (TIME)	Linear	61.077	32	1.909		
	Quadratic	35.471	32	1.108		

Table G71

Tests of Within-Subjects Effects for the Symptom Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	29.831	1.480	20.154	10.239	.001
TIME * SEX	2.601	1.480	1.757	.893	.389
TIME * MARITGP	1.352	1.480	.913	.464	.574
TIME * SEX * MARITGP	2.225	1.480	1.503	.764	.435
Error (TIME)	87.400	44.403	1.968		

Table G72

Tests of Within-Subjects Contrasts for Symptom Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	28.449	1	28.449	14.736	.001
	Quadratic	1.382	1	1.382	1.406	.245
TIME * SEX	Linear	2.341	1	2.341	1.213	.280
	Quadratic	.260	1	.260	.265	.610
TIME * MARITGP	Linear	.460	1	.460	.238	.629
	Quadratic	.892	1	.892	.907	.348
TIME * SEX * MARITGP	Linear	.863	1	.863	.447	.509
	Quadratic	1.363	1	1.363	1.386	.248
Error (TIME)	Linear	57.915	30	1.931		
	Quadratic	29.485	30	.983		

Table G73

Tests of Between-Subjects Effects for the Symptom Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	2067.668	1	2067.668	448.343	.000
SEX	.218	1	.218	.047	.830
MARITGP	.536	1	.536	.116	.735
SEX * MARITGP	2.826	1	2.826	.613	.440
Error	138.354	30	4.612		

Table G74

Tests of Within-Subjects Effects for the Symptom Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	22.315	1.522	14.660	7.129	.005
TIME * AGEGP	2.935	4.566	.643	.313	.889
TIME * SEX	.489	1.522	.321	.156	.797
TIME * AGEGP * SEX	4.226	3.044	1.388	.675	.574
Error (TIME)	84.509	41.098	2.056		

Table G75

Tests of Within-Subjects Contrasts for the Symptom Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	20.327	1	20.327	9.799	.004
	Quadratic	1.988	1	1.988	1.883	.181
TIME * AGEGP	Linear	2.806	3	.935	.451	.719
	Quadratic	.130	3	4.323E-02	.041	.989
TIME * SEX	Linear	.482	1	.482	.233	.634
	Quadratic	6.432E-03	1	6.432E-03	.006	.938
TIME * AGEGP * SEX	Linear	2.684	2	1.342	.647	.532
	Quadratic	1.543	2	.771	.731	.491
Error (TIME)	Linear	56.009	27	2.074		
	Quadratic	28.500	27	1.056		

Table G76

Tests of Between-Subjects Effects for the Symptom Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1727.695	1	1727.695	344.392	.000
AGEGP	4.108	3	1.369	.273	.844
SEX	3.354	1	3.354	.668	.421
AGEGP * SEX	2.246	2	1.123	.224	.801
Error	135.450	27	5.017		

Table G77

Tests of Within-Subjects Effects for the Activity Limitations Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	16.876	1.752	9.633	15.960	.000
TIME * SEX	2.209	1.752	1.261	2.089	.140
TIME * MARITGP	1.280	1.752	.731	1.211	.302
TIME * SEX * MARITGP	1.858	1.752	1.060	1.757	.186
Error (TIME)	31.723	52.559	.604		

Table G78

Tests of Within-Subjects Contrasts for the Activity Limitations Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	15.615	1	15.615	24.238	.000
	Quadratic	1.262	1	1.262	3.053	.091
TIME * SEX	Linear	2.208	1	2.208	3.428	.074
	Quadratic	7.440E-04	1	7.440E-04	.002	.966
TIME * MARITGP	Linear	.550	1	.550	.854	.363
	Quadratic	.730	1	.730	1.767	.194
TIME * SEX * MARITGP	Linear	.480	1	.480	.745	.395
	Quadratic	1.378	1	1.378	3.334	.078
Error (TIME)	Linear	19.326	30	.644		
	Quadratic	12.397	30	.413		

Table G79

Tests of Between-Subjects Effects for the Activity Limitations Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1458.200	1	1458.200	526.050	.000
SEX	6.536	1	6.536	2.358	.135
MARITGP	2.011	1	2.011	.726	.401
SEX * MARITGP	.522	1	.522	.188	.667
Error	83.159	30	2.772		

Table G80

Tests of Within-Subjects Effects for the Activity Limitations Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	14.721	1.724	8.541	12.333	.000
TIME * AGEGP	1.512	5.171	.292	.422	.836
TIME * SEX	.747	1.724	.434	.626	.516
TIME * AGEGP * SEX	1.790	3.447	.519	.750	.545
Error (TIME)	32.229	46.538	.693		

Table G81

Tests of Within-Subjects Contrasts for the Activity Limitations Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	12.423	1	12.423	16.390	.000
	Quadratic	2.298	1	2.298	5.274	.030
TIME * AGEGP	Linear	1.348	3	.449	.593	.625
	Quadratic	.164	3	5.460E-02	.125	.944
TIME * SEX	Linear	.531	1	.531	.700	.410
	Quadratic	.217	1	.217	.497	.487
TIME * AGEGP * SEX	Linear	.120	2	5.983E-02	.079	.924
	Quadratic	1.670	2	.835	1.917	.167
Error (TIME)	Linear	20.465	27	.758		
	Quadratic	11.764	27	.436		

Table G82

Tests of Between-Subjects Effects for the Activity Limitations Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1201.936	1	1201.936	399.295	.000
AGEGP	2.413	3	.804	.267	.848
SEX	3.913	1	3.913	1.300	.264
AGEGP * SEX	.282	2	.141	.047	.954
Error	81.274	27	3.010		

Table G83

Tests of Within-Subjects Effects for the Emotional Functioning Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	26.585	1.660	16.011	10.943	.000
TIME * MARITGP	.223	1.660	.134	.092	.879
TIME * SEX	1.441	1.660	.868	.593	.526
TIME * MARITGP * SEX	6.934E-02	1.660	4.176E-02	.029	.953
Error (TIME)	72.881	49.815	1.463		

Table G84

Tests of Within-Subjects Contrasts for the Emotional Functioning Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	24.748	1	24.748	16.185	.000
	Quadratic	1.837	1	1.837	2.041	.163
TIME *MARITGP	Linear	2.201E-04	1	2.201E-04	.000	.991
	Quadratic	.223	1	.223	.247	.623
TIME * SEX	Linear	1.434	1	1.434	.938	.341
	Quadratic	6.838E-03	1	6.838E-03	.008	.931
TIME *MARITGP * SEX	Linear	4.227E-02	1	4.227E-02	.028	.869
	Quadratic	2.706E-02	1	2.706E-02	.030	.864
Error (TIME)	Linear	45.872	30	1.529		
	Quadratic	27.009	30	.900		

Table G85

Tests of Between-Subjects Effects for the Emotional Functioning Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1782.803	1	1782.803	449.640	.000
MARITGP	4.090E-02	1	4.090E-02	.010	.920
SEX	1.420E-02	1	1.420E-02	.004	.953
MARITGP * SEX	8.569E-02	1	8.569E-02	.022	.884
Error	118.949	30	3.965		

Table G86

Tests of Within-Subjects Effects for the Emotional Functioning Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	23.327	1.561	14.945	9.910	.001
TIME * AGEGP	1.477	4.683	.315	.209	.950
TIME * SEX	.901	1.561	.577	.383	.633
TIME * AGEGP * SEX	6.457	3.122	2.068	1.371	.264
Error (TIME)	63.555	42.143	1.508		

Table G87

Tests of Within-Subjects Contrasts for the Emotional Functioning Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	20.908	1	20.908	13.201	.001
	Quadratic	2.419	1	2.419	3.141	.088
TIME * AGEGP	Linear	1.349	3	.450	.284	.837
	Quadratic	.128	3	4.279E-02	.056	.982
TIME * SEX	Linear	.420	1	.420	.266	.611
	Quadratic	.480	1	.480	.623	.437
TIME * AGEGP * SEX	Linear	1.908	2	.954	.602	.555
	Quadratic	4.549	2	2.274	2.953	.069
Error (TIME)	Linear	42.762	27	1.584		
	Quadratic	20.794	27	.770		

Table G88

Tests of Between-Subjects Effects for the Emotional Functioning Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1467.453	1	1467.453	347.788	.000
AGEGP	3.852	3	1.284	.304	.822
SEX	.844	1	.844	.200	.658
AGEGP * SEX	1.012	2	.506	.120	.887
Error	113.923	27	4.219		

Table G89

Tests of Within-Subjects Effects of the Environmental Stimuli Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	12.059	1.985	6.074	13.520	.000
Error (TIME)	27.650	61.548	.449		

Table G90

Tests of Within-Subjects Contrasts of the Environmental Stimuli Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	6.891	1	6.891	14.621	.001
	Quadratic	5.168	1	5.168	12.285	.001
Error (TIME)	Linear	14.609	31	.471		
	Quadratic	13.040	31	.421		

Table G91

Tests of Within-Subjects Effects for the Environmental Stimuli Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	7.624	1.980	3.850	8.131	.001
TIME * MARITGP	6.409E-03	1.980	3.237E-03	.007	.993
TIME * SEX	.154	1.980	7.780E-02	.164	.847
TIME * MARITGP * SEX	.376	1.980	.190	.401	.669
Error (TIME)	28.126	59.402	.473		

Table G92

Tests of Within-Subjects Contrasts for the Environmental Stimuli Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	5.052	1	5.052	10.297	.003
	Quadratic	2.572	1	2.572	5.755	.023
TIME * MARITGP	Linear	3.948E-03	1	3.948E-03	.008	.929
	Quadratic	2.461E-03	1	2.461E-03	.006	.941
TIME * SEX	Linear	9.078E-02	1	9.078E-02	.185	.670
	Quadratic	6.327E-02	1	6.327E-02	.142	.709
TIME * MARITGP * SEX	Linear	.176	1	.176	.359	.554
	Quadratic	.200	1	.200	.448	.509
Error (TIME)	Linear	14.717	30	.491		
	Quadratic	13.409	30	.447		

Table G93

Tests of Between-Subjects Effects for the Environmental Stimuli Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	994.808	1	994.808	286.310	.000
MARITGP	2.141E-02	1	2.141E-02	.006	.938
SEX	1.112	1	1.112	.320	.576
MARITGP * SEX	3.044E-02	1	3.044E-02	.009	.926
Error	104.238	30	3.475		

Table G94

Tests of Within-Subjects Effects for the Environmental Stimuli Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	6.183	1.962	3.151	6.100	.004
TIME * AGEGP	1.093	5.886	.186	.359	.898
TIME * SEX	.102	1.962	5.209E-02	.101	.901
TIME * AGEGP * SEX	.221	3.924	5.635E-02	.109	.978
Error (TIME)	27.365	52.974	.517		

Table G95

Tests of Within-Subjects Contrasts for the Environmental Stimuli Domain of the AQLQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	4.742	1	4.742	8.738	.006
	Quadratic	1.440	1	1.440	3.060	.092
TIME * AGEGP	Linear	.265	3	8.849E-02	.163	.920
	Quadratic	.827	3	.276	.586	.629
TIME * SEX	Linear	.100	1	.100	.185	.671
	Quadratic	1.852E-03	1	1.852E-03	.004	.950
TIME * AGEGP * SEX	Linear	2.390E-02	2	1.195E-02	.022	.978
	Quadratic	.197	2	9.860E-02	.209	.812
Error (TIME)	Linear	14.654	27	.543		
	Quadratic	12.711	27	.471		

Table G96

Tests of Between-Subjects Effects for the Environmental Stimuli Domain of the AQLQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	788.413	1	788.413	223.759	.000
AGEGP	5.282	3	1.761	.500	.686
SEX	2.836E-03	1	2.836E-03	.001	.978
AGEGP * SEX	2.580	2	1.290	.366	.697
Error	95.134	27	3.523		

Table G97

Tests of Within-Subjects Effects for Total AQLQ Score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	20.659	1.533	13.473	15.779	.000
TIME * SEX	1.755	1.533	1.144	1.340	.267
TIME * MARITGP	.777	1.533	.506	.593	.514
TIME * SEX * MARITGP	1.098	1.533	.716	.839	.411
Error (TIME)	39.279	46.002	.854		

Table G98

Tests of Within-Subjects Contrasts for Total AQLQ Score

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	19.128	1	19.128	22.118	.000
	Quadratic	1.532	1	1.532	3.446	.073
TIME * SEX	Linear	1.711	1	1.711	1.978	.170
	Quadratic	4.391E-02	1	4.391E-02	.099	.755
TIME * MARITGP	Linear	.251	1	.251	.290	.594
	Quadratic	.526	1	.526	1.182	.286
TIME * SEX * MARITGP	Linear	.440	1	.440	.509	.481
	Quadratic	.658	1	.658	1.481	.233
Error (TIME)	Linear	25.945	30	.865		
	Quadratic	13.334	30	.444		

Table G99

Tests of Between-Subjects Effects for Total AQLQ Score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1639.498	1	1639.498	567.256	.000
SEX	1.612	1	1.612	.558	.461
MARITGP	.593	1	.593	.205	.654
SEX * MARITGP	.610	1	.610	.211	.649
Error	86.707	30	2.890		

Table G100

Tests of Within-Subjects Effects for Total AQLQ Score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	16.977	1.509	11.252	12.031	.000
TIME * AGEGP	1.309	4.527	.289	.309	.890
TIME * SEX	.494	1.509	.327	.350	.646
TIME * AGEGP * SEX	2.099	3.018	.696	.744	.533
Error (TIME)	38.100	40.739	.935		

Table G101

Tests of Within-Subjects Contrasts for Total AQLQ Score

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	14.886	1	14.886	15.544	.001
	Quadratic	2.091	1	2.091	4.613	.041
TIME * AGEGP	Linear	1.280	3	.427	.445	.723
	Quadratic	2.917E-02	3	9.722E-03	.021	.996
TIME * SEX	Linear	.426	1	.426	.445	.510
	Quadratic	6.792E-02	1	6.792E-02	.150	.702
TIME * AGEGP * SEX	Linear	.789	2	.394	.412	.666
	Quadratic	1.310	2	.655	1.445	.253
Error (TIME)	Linear	25.858	27	.958		
	Quadratic	12.242	27	.453		

Table G102

Tests of Between-Subjects Effects for Total AQLQ Score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1353.090	1	1353.090	425.152	.000
AGEGP	.544	3	.181	.057	.982
SEX	2.315	1	2.315	.727	.401
AGEGP * SEX	.548	2	.274	.086	.918
Error	85.930	27	3.183		

Table G103

Tests of Within-Subjects Effects for PCAQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	254.248	1.998	127.281	8.851	.000
TIME * MARITGP	12.835	1.998	6.425	.447	.641
TIME * SEX	28.398	1.998	14.217	.989	.378
TIME * MARITGP * SEX	1.908	1.998	.955	.066	.936
Error (TIME)	919.221	63.921	14.381		

Table G104

Tests of Within-Subjects Contrasts for PCAQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	174.476	1	174.476	11.877	.002
	Quadratic	79.773	1	79.773	5.684	.023
TIME * MARITGP	Linear	12.808	1	12.808	.872	.357
	Quadratic	2.736E-02	1	2.736E-02	.002	.965
TIME * SEX	Linear	13.674	1	13.674	.931	.342
	Quadratic	14.725	1	14.725	1.049	.313
TIME * MARITGP * SEX	Linear	1.819	1	1.819	.124	.727
	Quadratic	8.864E-02	1	8.864E-02	.006	.937
Error (TIME)	Linear	470.104	32	14.691		
	Quadratic	449.117	32	14.035		

Table G105

Tests of Between-Subjects Effects for PCAQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	124397.308	1	124397.308	1654.408	.000
MARITGP	52.059	1	52.059	.692	.412
SEX	42.145	1	42.145	.560	.460
MARITGP * SEX	113.540	1	113.540	1.510	.228
Error	2406.126	32	75.191		

Table G106

Tests of Within-Subjects Effects for PCAQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	270.097	1.990	135.724	9.222	.000
TIME * AGEGP	33.629	5.970	5.633	.383	.886
TIME * SEX	12.876	1.990	6.470	.440	.646
TIME * AGEGP * SEX	54.853	5.970	9.188	.624	.709
Error (TIME)	820.080	55.721	14.718		

Table G107

Tests of Within-Subjects Contrasts for PCAQ

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	183.214	1	183.214	11.686	.002
	Quadratic	86.883	1	86.883	6.384	.017
TIME * AGEGP	Linear	12.980	3	4.327	.276	.842
	Quadratic	20.649	3	6.883	.506	.681
TIME * SEX	Linear	.524	1	.524	.033	.856
	Quadratic	12.352	1	12.352	.908	.349
TIME * AGEGP * SEX	Linear	23.401	3	7.800	.498	.687
	Quadratic	31.452	3	10.484	.770	.520
Error (TIME)	Linear	439.002	28	15.679		
	Quadratic	381.078	28	13.610		

Table G108

Tests of Between-Subjects Effects for PCAQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	91233.273	1	91233.273	1224.792	.000
AGEGP	189.876	3	63.292	.850	.479
SEX	7.232	1	7.232	.097	.758
AGEGP * SEX	370.881	3	123.627	1.660	.198
Error	2085.685	28	74.489		

Table G109

Tests of Within-Subjects Effects for PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	19736.000	1.859	10618.372	4.206	.024
Error (TIME)	112614.000	44.608	2524.527		

Table G110

Tests of Within-Subjects Contrasts for PEFR

Source	FACTOR1	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	16562.000	1	16562.000	6.128	.021
	Quadratic	3174.000	1	3174.000	1.595	.219
Error (TIME)	Linear	64863.000	24	2702.625		
	Quadratic	47751.000	24	1989.625		

Table G111

Tests of Within-Subjects Effects for PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	21397.382	1.799	11891.779	4.470	.021
TIME * SEX	5959.834	1.799	3312.229	1.245	.296
TIME * MARITGP	968.008	1.799	537.979	.202	.795
TIME * SEX * MARITGP	3404.789	1.799	1892.241	.711	.483
Error (TIME)	100529.630	37.786	2660.486		

Table G112

Tests of Within-Subjects Contrasts for PEFR

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	20172.462	1	20172.462	7.630	.012
	Quadratic	1224.920	1	1224.920	.572	.458
TIME * SEX	Linear	4455.220	1	4455.220	1.685	.208
	Quadratic	1504.614	1	1504.614	.702	.412
TIME * MARITGP	Linear	25.335	1	25.335	.010	.923
	Quadratic	942.672	1	942.672	.440	.514
TIME * SEX * MARITGP	Linear	3163.266	1	3163.266	1.196	.286
	Quadratic	241.523	1	241.523	.113	.740
Error (TIME)	Linear	55523.611	21	2643.981		
	Quadratic	45006.019	21	2143.144		

Table G113

Tests of Between-Subjects Effects for PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	10266241.770	1	10266241.770	458.754	.000
SEX	251662.077	1	251662.077	11.246	.003
MARITGP	12135.129	1	12135.129	.542	.470
SEX * MARITGP	267.313	1	267.313	.012	.914
Error	469948.843	21	22378.516		

Table G114

Tests of Within-Subjects Effects for PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	19502.366	1.530	12747.625	3.963	.041
TIME * SEX	5600.872	1.530	3660.982	1.138	.322
TIME * AGEGP	9624.444	4.590	2096.990	.652	.650
TIME * SEX * AGEGP	19842.222	4.590	4323.257	1.344	.279
Error (TIME)	83662.500	26.008	3216.799		

Table G115

Tests of Within-Subjects Contrasts for PEFR

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	15952.014	1	15952.014	4.785	.043
	Quadratic	3550.352	1	3550.352	2.237	.153
TIME * SEX	Linear	5041.669	1	5041.669	1.512	.236
	Quadratic	559.203	1	559.203	.352	.561
TIME * AGEGP	Linear	1205.496	3	401.832	.121	.947
	Quadratic	8418.948	3	2806.316	1.768	.191
TIME * SEX * AGEGP	Linear	2548.353	3	849.451	.255	.857
	Quadratic	17293.869	3	5764.623	3.632	.034
Error (TIME)	Linear	56678.819	17	3334.048		
	Quadratic	26983.681	17	1587.275		

Table G116

Tests of Between-Subjects Effects for PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	8320058.851	1	8320058.851	336.879	.000
SEX	152320.920	1	152320.920	6.167	.024
AGEGP	46977.837	3	15659.279	.634	.603
SEX * AGEGP	11118.393	3	3706.131	.150	.928
Error	419856.944	17	24697.467		

Table G117

Tests of Within-Subjects Effects for Percent Predicted PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	746.793	1.853	402.967	4.044	.027
Error (TIME)	4432.257	44.478	99.651		

Table G118

Tests of Within-Subjects Contrasts for Percent Predicted PEFR

Source	FACTOR1	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	600.180	1	600.180	5.561	.027
	Quadratic	146.613	1	146.613	1.910	.180
Error (TIME)	Linear	2590.068	24	107.919		
	Quadratic	1842.189	24	76.758		

Table G119

Tests of Within-Subjects Effects for Percent Predicted PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	694.288	1.812	383.064	3.577	.042
TIME * SEX	154.353	1.812	85.162	.795	.448
TIME *MARITGP	30.047	1.812	16.578	.155	.837
TIME * SEX *MARITGP	103.244	1.812	56.963	.532	.574
Error (TIME)	4076.292	38.062	107.097		

Table G120

Tests of Within-Subjects Contrasts for Percent Predicted PEFR

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	642.830	1	642.830	5.748	.026
	Quadratic	51.458	1	51.458	.625	.438
TIME *SEX	Linear	75.317	1	75.317	.673	421
	Quadratic	79.035	1	79.035	.961	.338
TIME *MARITGP	Linear	5.560	1	5.560	.050	.826
	Quadratic	24.486	1	24.486	.298	.591
TIME * SEX *MARITGP	Linear	97.657	1	97.657	.873	.361
	Quadratic	5.587	1	5.587	.068	.797
Error (TIME)	Linear	2348.539	21	111.835		
	Quadratic	1727.753	21	82.274		

Table G121

Tests of Between-Subjects Effects for Percent Predicted PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	370624.100	1	370624.100	431.742	.000
SEX	1.909	1	1.909	.002	.963
MARITGP	223.249	1	223.249	.260	.615
SEX * MARITGP	3.321	1	3.321	.004	.951
Error	18027.195	21	858.438		

Table G122

Tests of Within-Subjects Effects for Percent Predicted PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	615.560	1.612	381.883	2.944	.079
TIME * SEX	150.967	1.612	93.658	.722	.466
TIME * AGEGP	259.027	4.836	53.565	413	.830
TIME * SEX * AGEGP	612.716	4.836	126.706	.977	.448
Error (TIME)	3554.648	27.402	129.720		

Table G123

Tests of Within-Subjects Contrasts for Percent Predicted PEFR

Source	TIME	Type III Sum of Squares	df	Mean Square	F	Sig.
TIME	Linear	488.625	1	488.625	3.497	.079
	Quadratic	126.935	1	126.935	1.829	.194
TIME * SEX	Linear	108.411	1	108.411	.776	.391
	Quadratic	42.557	1	42.557	.613	.444
TIME * AGEGP	Linear	51.065	3	17.022	.122	.946
	Quadratic	207.961	3	69.320	.999	.417
TIME * SEX * AGEGP	Linear	94.284	3	31.428	.225	.878
	Quadratic	518.432	3	172.811	2.490	.095
Error (TIME)	Linear	2375.026	17	139.707		
	Quadratic	1179.622	17	69.390		

Table G124

Tests of Between-Subjects Effects for Percent Predicted PEFR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	294291.055	1	294291.055	297.946	.000
SEX	4.836	1	4.836	.005	.945
AGEGP	1143.332	3	381.111	.386	.765
SEX * AGEGP	389.658	3	129.886	.131	.940
Error	16791.469	17	987.733		